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# Appendix J

Forest Service

Draft Management Indicator Species Report and  
Draft Wildlife and Sensitive Plant Specialists Report



Draft  
Management Indicator Species Report

for the

Greater Sage-Grouse Conservation Effort to Amend the  
Humboldt-Toiyabe National Forest Plans

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## I. INTRODUCTION

The National Forest Management Act (NFMA) directs National Forests to identify Management Indicator Species (MIS). MIS are chosen as a representative of certain habitat conditions important to a variety of other species. MIS are generally presumed to be sensitive to habitat changes. By monitoring and assessing populations of MIS, managers can determine if management actions are affecting other species populations. The Humboldt and Toiyabe National Forest Plans (USDA Forest Service 1986a and USDA Forest Service 1986b, respectively) identify the species listed in Table 1 as MIS for the Humboldt-Toiyabe National Forest. Land and resource management plans for the Humboldt National Forest and the Toiyabe National Forest were finalized in 1986. The forests were managed separately until they were administratively combined into the Humboldt-Toiyabe National Forest in 1996. Because the forests have not undergone a forest plan revision since they were combined, each unit continues to follow its respective plan and associated amendments. There are no plant MIS on the Humboldt-Toiyabe National Forest.

*Table 1. Humboldt-Toiyabe National Forest MIS list*

Common Name	Scientific name	Forest(s)
Mule deer	<i>Odocoileus hemionus</i>	Humboldt & Toiyabe
Pine marten	<i>Martes martes</i>	Toiyabe
Palmer's chipmunk	<i>Neotamias palmeri</i>	Toiyabe
Northern goshawk	<i>Accipiter gentilis</i>	Humboldt & Toiyabe
Greater Sage-Grouse	<i>Centrocercus urophasianus</i>	Humboldt & Toiyabe
Yellow warbler	<i>Dendroica petechia</i>	Toiyabe
Hairy woodpecker	<i>Picoides villosus</i>	Toiyabe
Williamson's sapsucker	<i>Sphyrapicus thyroideus</i>	Toiyabe
Yellow-bellied sapsucker	<i>Sphyrapicus varius</i>	Toiyabe
Lahontan cutthroat trout	<i>Oncorhynchus clarkii henshawi</i>	Humboldt & Toiyabe
Paiute cutthroat trout	<i>Paiute cutthroat trout</i>	Toiyabe
Bonneville cutthroat trout	<i>Oncorhynchus clarkii utah</i>	Humboldt
Other trout species	<i>n/a</i>	Humboldt
Macroinvertebrates	<i>n/a</i>	Toiyabe

The 1982 (36 CFR 219.19) regulations for viability state that the Forest Service has the responsibility to provide sufficient habitat that can support viable populations of native and desired nonnative vertebrates across the planning area at a level that populations are likely to persist on National Forest System (NFS) lands.

On December 18, 2009 the Department of Agriculture issued a final rule reinstating the National Forest System Land and Resource Management Planning rule of November 9, 2000, as amended (2000 rule) (74 FR 242 [67059-67075]). This rescinded the 1982 planning rule. The 2000 rule states: Projects implementing land management plans must comply with the transition provisions of 36 CFR §219.35, but not any other provisions of the planning rule. Projects implementing land management plans and plan amendments, as appropriate, must be developed considering the best available science in accordance with §219.35(a). Projects implementing land management plans must be consistent with the provisions of the governing plans.

In order to address the MIS species, the issues surrounding the change in planning rules, and to assure the best available science was used our approach was as follows:

1. Identify habitat and population characteristics/trends by Forest
2. Identify the role of the habitat on each Forest in the overall viability of the population
3. Analyze effects of each alternative based on relevant threats, as well as current and past management
4. Make a determination whether the effects of the alternatives will affect overall viability

## **II. PROJECT HISTORY**

Greater Sage-Grouse have emerged as a significant conservation concern over the last 10 years. The species is currently a candidate species for listing under the Endangered Species Act inferring that listing is “warranted, but precluded due to higher priorities” because of two primary factors: 1) the large-scale loss and fragmentation of habitats across the species range, and 2) a lack of regulatory mechanisms in place to ensure the conservation of the species. The primary threats to sage-grouse habitat are summarized in the listing decision. The two dominant threats are related to infrastructure associated with energy development in the eastern portion of the species range, and the conversion of sagebrush communities to annual grasslands associated resulting in large uncharacteristic wildfires in the western portion of the species range (U.S. Fish and Wildlife Service 2010).

The Bureau of Land Management (BLM) manages approximately half of the Greater Sage-Grouse habitats, whereas the Forest Service (FS) manages approximately 8 percent of species habitat, with most of that occurring on national forests in the Intermountain Region. The Forest Service manages approximately 9 million acres of sage-brush habitats, of which about 7.5 million acres occurring in the Intermountain Region. Most habitats on FS administered lands contribute to summer brood-rearing habitats, although some forests and grasslands do contribute important breeding nesting and winter habitat.

In 2011 and 2012, the United States Fish and Wildlife Service (FWS) submitted letters to the BLM and FS recommending that the agencies amend Land Use Plans to provide adequate

regulatory mechanisms to conserve the species. Originally, this recommendation identified 10 National Forests viewed as “high priority” to ensure appropriate regulatory mechanisms. Following scoping and discussion the FS added an additional 10 Forest Plans that would be considered for amendment. The FS is participating in several joint Environmental Impact Statements (EISs) with the BLM to develop Records of Decision that will be used as a basis for amending Land Use Plans, including Forest Plans.

Since half of all Greater Sage-Grouse habitat occurs on BLM lands, the BLM is leading the effort to amend or revise land use plans, with the Forest Service as a cooperating agency. The purpose is to provide direction in land management plans that conserve and protect sage-grouse habitat and to provide assurances to the U.S. Fish and Wildlife Service (USFWS) that adequate regulatory mechanisms are in place to ensure the conservation of the species. EISs will be completed for seven sage-grouse planning subregions: 1) eastern Montana and portions of North and South Dakota, 2) Idaho and southwest Montana, 3) Oregon, 4) Wyoming, 5) northwest Colorado, 6) Utah, and 7) Nevada and northern California. The FS is participating in six of these EISs (excluding Eastern Montana/Dakotas and some of the areas in Wyoming). The EISs will include joint agency signatures, but separate Records of Decision.”

This Management Indicator Species report is being prepared to address National Forest System-administered lands in support of the Nevada and northern California EIS. The Humboldt-Toiyabe National Forest in Nevada is planning to amend their respective Land and Resource Management Plans for the Greater Sage-Grouse. MIS were reviewed to determine which are present and/or have habitat in the analysis area, and to identify those likely to be affected by the implementation of a management decision. Table 2 outlines Humboldt-Toiyabe National Forest MIS, their presence in the analysis area, and anticipated effects due to implementation of an action alternative.

*Table 2. Humboldt-Toiyabe National Forest MIS, presence in the analysis area, and anticipated effects from implementation of an action alternative.*

<b>Common name of MIS</b>	<b>Management issue</b>	<b>Species present in analysis area?</b>	<b>Habitat present in analysis area?</b>	<b>Summary of anticipated effects from implementation of an action alternative to MIS</b>
Mule deer	All vegetative types (Humboldt); deer habitat (Toiyabe)	Y	Y	A widespread resident of NV, with habitats ranging from low-elevation shrublands to upper elevation subalpine communities
Pine marten	Habitat capability (only for the Sierra Nevada Range)	N	N	Usually in dense deciduous, mixed, or (especially) coniferous upland and lowland forest. No habitat within mapped PPH or PGH habitat. Implementation of the alternatives will cause no changes to populations of pine marten or their habitat. Therefore, this species <u>will not be evaluated</u> in more detail.
Palmer's chipmunk	Coniferous forest (SMRNA)	N	N	Uses large rocks, logs, or cliff crevices in coniferous forests. No habitat within mapped PPH or PGH habitat. Implementation of the alternatives will cause no changes to populations of Palmer's chipmunk or their habitat. Therefore, this species <u>will not be evaluated</u> in more detail.
Northern goshawk	Old growth cottonwood, aspen and fir stands associated with riparian areas (Humboldt); Mature and old growth habitats (DF, Mixed Fir) -	N	N	Typically inhabit late seral or old growth forests that have closed canopies (greater than 40 percent) and a relatively open understory. No habitat within mapped PPH or PGH habitat. Implementation of the alternatives will cause no changes to populations of northern goshawk or their habitat. Therefore, this species <u>will not be evaluated</u> in more detail.



	now may refer to mature/old growth Apsen (Toiyabe)			
Sage-Grouse	Sagebrush-grass, riparian (Humboldt); livestock impacts on key habitat (Toiyabe)	Y	Y	Uses the following habitats in Nevada: sagebrush, montane shrubland, wet meadow; agriculture, springs; montane riparian, aspen; and Great Basin Lowland Riparian with sagebrush species (esp. Wyoming big sagebrush, mountain big sagebrush, and low sagebrush), flowering forbs, agricultural crops (particularly alfalfa), variety of montane shrubs, aspen, alder, willow
Yellow warbler	Willow and riparian habitat	N	N	Uses open scrub, second-growth woodland, thickets, farmlands, and gardens, especially near water; riparian woodlands, especially willows, with closed canopies. The alternatives propose some changes to grazing management, but it is not anticipated that these actions will affect in more than a negligible way the yellow warbler or its habitat. This species <u>will not be evaluated</u> in more detail.
Hairy Wood-pecker	Snag habitat	N	N	Utilizes forested environment with suitable snags or live trees for nesting habitat. No habitat within mapped PPH or PGH habitat. Implementation of the alternatives will cause no changes to populations of hairy woodpecker or their habitat. Therefore, this species <u>will not be evaluated</u> in more detail.
Williamson's sapsucker	Snag habitat	N	N	Utilizes forested environment with suitable snags or live trees for nesting habitat. No habitat within mapped PPH or PGH habitat. Implementation of the alternatives will cause no changes to populations of Williamson's sapsucker or their habitat. Therefore, this species <u>will not be evaluated</u> in more detail.
Red-naped sapsucker	Snag habitat (SMRNA)	N	N	Utilizes forested environment with suitable snags or live trees for nesting habitat. No habitat within mapped PPH or PGH habitat. Implementation of the alternatives will cause no changes to populations of red-naped sapsucker or their habitat. Therefore, this species <u>will not be evaluated</u> in more detail.
Lahontan cutthroat trout	Riparian (Humboldt); occupied aquatic habitat	Y	Y	Inhabit both lakes and streams, but are obligatory stream spawners in habitat is characterized by well-vegetated and stable streambanks, stream bottoms with relatively silt-free gravel/rubble substrate, cool water, and pools in close proximity to cover and velocity breaks. There are records of the species within PPH/PGH habitat. Subsequent review of the alternatives indicates that this species will experience no effects to its

	(Toiyabe)			habitat or populations. None of the alternatives is expected to impact any of the identified limiting factors for Lahontan cutthroat trout or its life requirements. Based on these factors, Lahontan cutthroat trout <u>will not be analyzed</u> in additional detail.
Paiute cutthroat trout	Occupied aquatic habitat	N	N	Historic range included the Silver King Creek system, Toiyabe NF, CA, and introduced populations occur in CA – all outside of the range of GSG PPH or PGH habitat. Implementation of the alternatives will cause no changes to populations of Paiute cutthroat trout or their habitat. Therefore, this species <u>will not be evaluated</u> in additional detail.
Bonneville cutthroat trout	Riparian	Y	Y	Occur within the Bonneville Basin in relatively cool, well-oxygenated water with clean, well-sorted gravels and minimal fine sediments. There are records of the species within PPH/PGH habitat. Subsequent review of the alternatives indicates that this species will experience no effects to its habitat or populations. None of the alternatives is expected to impact any of the identified limiting factors for Bonneville cutthroat trout or its life requirements. Based on these factors, Bonneville cutthroat trout <u>will not be analyzed</u> in additional detail.
Other trout species	Riparian	Y	Y	Includes seven salmonid species present within perennial waters on the Humboldt National Forest: Lahontan and Bonneville cutthroat trout (separately considered MIS species), bull trout, redband trout, rainbow trout, brown trout, and brook trout. There are records of these species within PPH/PGH habitat. Subsequent review of the alternatives indicates that these species will experience no effects to their habitat or populations. None of the alternatives is expected to impact any of the identified limiting factors for trout species or their life requirements. Based on these factors, other trout species <u>will not be analyzed</u> in additional detail.
Macroinvertebrates	Aquatic habitat	Y	Y	Live on the bottom of freshwater habitats during all or part of their life cycle. Widespread throughout the Toiyabe National Forest and can be found in all types of perennial and ephemeral aquatic habitats including lakes, streams, seeps, and springs. Although freshwater habitats within PPH and PGH habitat may contain these species, subsequent review of the alternatives indicates that these species will experience no effects to their habitat or populations. None of the alternatives is expected to impact any of the identified limiting factors for macroinvertebrates or their life requirements. Based on these factors, macroinvertebrates <u>will not be analyzed</u> in additional detail.

### **III. PURPOSE AND NEED**

The purpose of the Land and Resource Management Plan amendments for the Greater Sage-Grouse is to identify and incorporate appropriate conservation measures to conserve, enhance, and/or restore sage-grouse habitat by reducing, eliminating, or minimizing threats to their habitat. The need to create this amendment arose when the inadequacy of regulatory mechanisms was identified as a significant threat in the USFWS finding on the petition to list the Greater Sage-Grouse. The USFWS identified conservation measures within Forest Service Land and Resource Management Plans (as well as BLM Land Use Plans) as the principal regulatory mechanisms for habitat conservation. Therefore, the Land and Resource Management Plan amendments will focus on areas affected by threats to sage-grouse habitat identified by the USFWS in the March 2010 listing decision (USFWS 2010).

### **IV. DESCRIPTION OF THE ALTERNATIVES**

#### **Alternative A:**

Under the No Action Alternative, the Forest Land and Resource Management Plans would not be amended. Current plans direction and prevailing conditions set forth in the plans for sage-grouse and sagebrush habitats would continue. The No Action Alternative highlights those decisions that can be shown to have a direct effect or link to conserving or restoring Greater Sage-Grouse habitat or sagebrush vegetation communities that support Greater Sage-Grouse throughout its life cycle. Goals and objectives for BLM- and Forest Service-administered lands and mineral estate would not change. Appropriate and allowable uses and restrictions pertaining to activities such as mineral leasing and development, recreation, construction of utility corridors, and livestock grazing would also remain the same. The BLM and Forest Service would not modify existing or establish additional criteria to guide the identification of site-specific use levels for implementation activities.

#### **Alternative B:**

Greater Sage-Grouse conservation measures in A Report on National Greater Sage-Grouse Conservation Measures [Sage-grouse National Technical Team (NTT) Report 2011] were used to form BLM and Forest Service management direction under Alternative B. To ensure BLM and Forest Service management actions are effective and based on the best available science, the BLM's National Policy Team created a National Technical Team in August 2011. The BLM's objective for chartering this planning strategy effort was to develop new or revised regulatory mechanisms, through land use plans, to conserve and restore Greater Sage-Grouse and its habitat on BLM-administered and National Forest System lands on a range-wide basis over the long term. Conservation measures in the report are focused primarily on Greater Sage-Grouse preliminary priority habitat (PPH) areas. PPH areas have the highest conservation value to maintaining or increasing sage-grouse populations. See Chapter 2 of the DEIS for additional information.

### **Alternative C:**

During scoping individuals and conservation groups had the opportunity to submit management direction recommendations for protection and conservation of Greater Sage-Grouse and its habitat. Western Watersheds Project (WWP) submitted a complete alternative proposal in their scoping comment letter. The recommendations by WWP, in conjunction with resource allocation opportunities and internal sub-regional BLM and Forest Service input, were reviewed to develop BLM and Forest Service management direction for Greater Sage-Grouse under Alternative C. Conservation measures in Alternative C are mostly focused on all occupied Greater Sage-Grouse habitat areas: PPH and preliminary general habitat (PGH). Refer to Chapter 2 of the DEIS for additional information.

### **Alternative D:**

Alternative D is the BLM and Forest Service, Nevada and Northeastern California Sub-region's adjustments alternative, which emphasizes balancing resources and resource use among competing human interests, land uses, and the conservation of natural and cultural resource values, while sustaining and enhancing ecological integrity across the landscape, including plant, wildlife, and fish habitat. This alternative modifies the recommendations from the NTT Report to provide a balanced level of protection, restoration, enhancement, and use of resources and services to meet ongoing programs and land uses. The goal of the agency developed alternative is to provide for no unmitigated loss to sage-grouse. No unmitigated loss is described as follows: Continued losses of sage-grouse habitat through natural events such as wildfire are expected to continue. Therefore, it is incumbent on the BLM and Forest Service to minimize loss of habitat or habitat functionality arising from discretionary agency actions or authorizations. The concept of "no unmitigated loss" includes a suite of actions that can be taken to off-set or restore direct and indirect disturbances on Greater Sage-Grouse habitat. See Chapter 2 of the DEIS for additional information.

### **Alternative E:**

Alternative E is based on the State of Nevada's Conservation Plan for Greater Sage-Grouse in Nevada and would apply to all BLM- and Forest Service-administered lands in Nevada. The State of California did not submit a proposal for a complete alternative and as such, Alternative E would only apply to BLM and Forest Service-administered lands in Nevada. The goals, objectives, and actions under Alternative E reflect concurrent state-level planning efforts for the protection of Greater Sage-Grouse and its habitat. Since state-level planning efforts focus on all lands within the state, regardless of ownership, certain actions under Alternative E would not be legally implementable on public lands unless these lands were incorporated into the federal decision.

The Nevada State Plan identifies 15 sage-grouse management areas (SGMAs) located across the state (refer to Chapter 2 of the DEIS). The Sage-Grouse Management Area map defines the overall area where the state would like resources to be managed to maintain and expand Sage-Grouse populations (refer to Chapter 2 of the DEIS). The State of Nevada Sage-Grouse Management Area map is based on the best biological information and knowledge at this time,

taking into account the 85 percent breeding bird density, Nevada Department of Wildlife's (NDOW's) Preliminary Priority and General Habitat maps, and areas of known resource conflicts. Refer to Chapter 2 of the DEIS for additional information.

#### **Alternative F:**

Similar to Alternative C, Alternative F is based on recommendations submitted by individuals and conservation groups (including Wild Earth Guardians) for the protection and conservation of Greater Sage-Grouse and its habitat. Alternative F includes similar goals, objectives, and actions as Alternative C, but with notable differences, particularly related to grazing, lands and realty, and minerals. Like Alternative C, conservation measures in Alternative F are mostly focused on all occupied Greater Sage-Grouse habitat areas (PPH and PGH). See Chapter 2 of the DEIS for additional information.

### **V. ANALYSIS AREA**

The planning area is the geographic area within which the BLM and Forest Service will make decisions during this planning effort. The planning area boundary includes all lands regardless of jurisdiction (Figure 1). For the EIS and LUP amendments, the planning area is the entire sub-region. Lands addressed in the LUP amendments will be lands (including surface and split estate lands with BLM subsurface mineral rights) managed by the BLM and Forest Service in Greater Sage-Grouse habitats. Any decisions in the LUP amendments will apply only to BLM-or Forest Service-administered lands (Decision Area). The LUP amendments will be limited to making land use planning decisions specific to the conservation of Greater Sage-Grouse and their habitat.

The Humboldt-Toiyabe National Forest administers two forest LRMPs that will also be amended by this LUP amendment/EIS. Lands within the planning area include a mix of private, federal, and state lands.

The planning area incorporates PPH and PGH (Figure 2). Though the planning area includes private lands, decisions in this amendment are made only for BLM-administered, and Forest Service-administered lands. Management direction and actions outlined in the EIS apply only to these BLM-and Forest Service-administered lands in the planning area and to federal mineral estate under BLM jurisdiction that may lie beneath other surface ownership. See Chapter 1 of the DEIS. This analysis focuses solely on National Forest-administered lands within the analysis area.



## Nevada/California Greater Sage-Grouse EIS

### EIS Boundaries and Associated National Forests

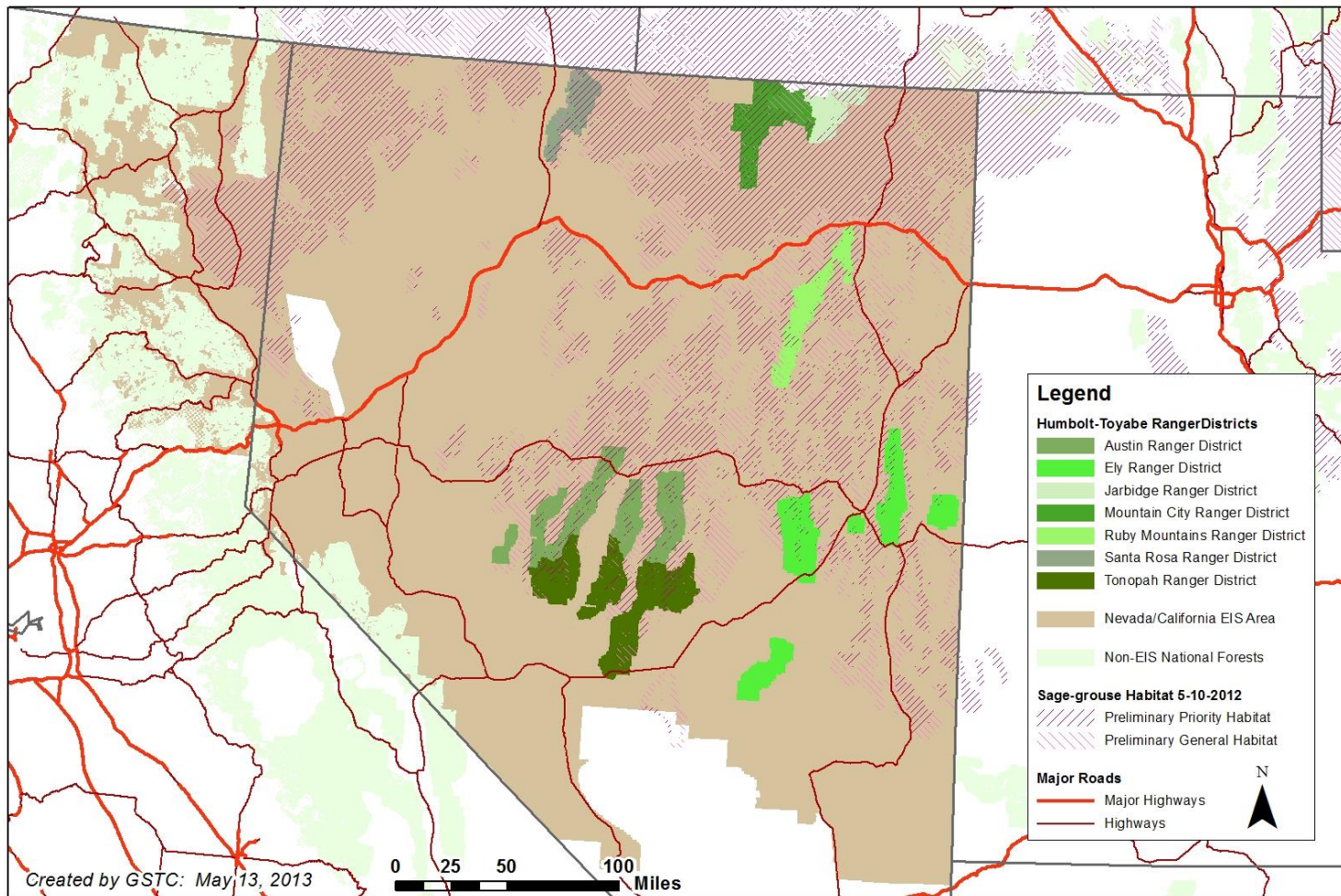


Figure 1. Nevada and northeastern California EIS analysis area showing National Forest-administered lands





## Preliminary Priority and General Sage-Grouse Habitat and WAFWA Management Zones

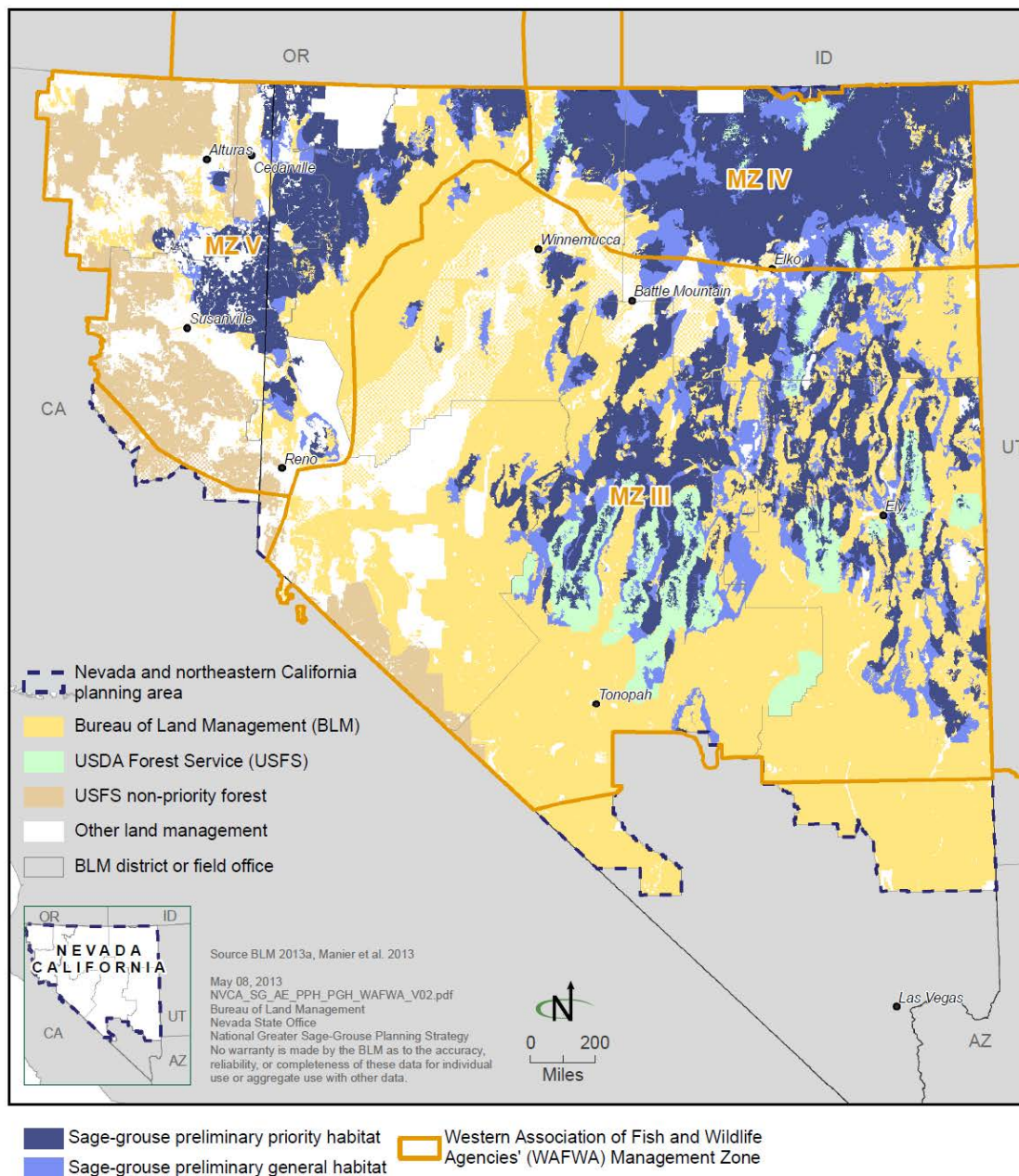


Figure 2. Nevada and northeastern California analysis showing PPH, PGH and Western Association of Fish and Wildlife Agencies (WAFWA) management zones

## VI. SPECIES INFORMATION AND EFFECTS ANALYSIS (Direct, Indirect and Cumulative)

### A. Greater Sage-Grouse (*Centrocercus urophasianus*)

#### Life History

Sage-grouse depend on a variety of semiarid shrub-grassland (shrub steppe) habitats throughout their life cycle, and are considered obligate users of sagebrush (e.g., *Artemisia tridentata* ssp. *wyomingensis* (Wyoming big sagebrush), *A. t.* ssp. *vaseyana* (mountain big sagebrush), and *A. t. tridentata* (basin big sagebrush)) (Patterson 1952; Braun *et al.* 1976; Connelly *et al.* 2000; Connelly *et al.* 2004; Miller *et al.* 2011). Sage-grouse also use other sagebrush species (which can be locally important) such as *A. arbuscula* (low sagebrush), *A. nova* (black sagebrush), *A. frigida* (fringed sagebrush), and *A. cana* (silver sagebrush) (Schroeder *et al.* 1999; Connelly *et al.* 2004). Sage-grouse distribution is strongly correlated with the distribution of sagebrush habitats (Schroeder *et al.* 2004; Connelly *et al.* 2011b). Sage-grouse exhibit strong site fidelity (loyalty to a particular area) to seasonal habitats (i.e., breeding, nesting, brood rearing, and wintering areas) (Connelly *et al.* 2004; Connelly *et al.* 2011a). Adult sage-grouse rarely switch from these habitats once they have been selected, limiting their ability to respond to changes in their local environments (Schroeder *et al.* 1999). (Life history section was copied from the USFWS FINAL COT report – Feb. 2013)

Based on GIS analysis of the EIS planning area, the following table describes the number of acres of GRSG PPH and PGH on the Humboldt-Toiyabe National Forest and the percentage of the Forest considered occupied habitat.

FORESTNAME	Forest Acres	PPH	PGH	Total Occupied	% of Forest
Humboldt-Toiyabe	4,661,100	1,183,600	539,900	1,723,500	37%

\* NV acres had to be rounded to nearest 100 acres due to boundary sliver polygons between FS boundaries (developed for SG EIS) and EDW District data boundaries.

Habitat conditions and population information were largely taken from the USFWS FINAL COT report – Feb. 2013.

#### Habitat and Population Condition by Forest

##### Humboldt-Toiyabe NF

The Humboldt-Toiyabe (H-T) National Forest is unique in that there are 7 ranger districts that contain sage-grouse habitat that are spread out over a very large area in the central and southern portion of the Great Basin in Nevada. All of the ranger districts that comprise the Humboldt-Toiyabe National Forest are found within two grouse populations: Great Basin core and Quinn Canyon.

The Nevada portion of this population contains the largest number of sage-grouse in this population delineation. Suitable habitats are somewhat uncharacteristic of sage-grouse habitats because use areas are disjunct, but connected. This is due to the “basin and range” topography that is characteristic of this region. Lower elevation valley bottoms often are dominated by



playas and salt desert shrub vegetation, but transcend quickly into sagebrush dominated benches, which often comprises the breeding and winter habitat. Moving up in elevation, pinyon-juniper woodlands dominate the mid-elevation and gives way to little sagebrush, mountain big sagebrush and mountain shrub communities used by sage-grouse as nesting and brood rearing habitat in the higher elevations (> 2,200 m). There are a total of 1,183,600 acres of PPH and 539,900 acres of PGH on the Humboldt-Toiyabe National Forest.

Garton et al. (2011) determined that this population has declined by 19 percent from the period 1965-69 through 2000-2007 and that average rates of population change were <1.0 for three of the eight analysis periods from 1965-2007. In addition, Garton et al. (2011) determined that this population has a two percent chance of declining below 200 males within the next 30 years and a 78 percent chance of declining below 200 males within 100 years (by 2107).

The Quinn Canyon population is a very small and isolated population located in southeastern Nevada. There were not enough data for Garton *et al.* (2011) to conduct an analysis on population trends or persistence. Two to three leks have been identified in this area, but there is very little information associated with these sites and most of this information is anecdotal. Habitat within this area has been compromised by pinyon-juniper encroachment. Very little sagebrush exists within this population. Overall this is a high risk population.

### **Threats by Forest**

#### Humboldt-Toiyabe NF

Threats to sage-grouse on and around the Humboldt-Toiyabe NF include, but are not limited to fragmentation and loss of habitat, primarily from fire, wind and solar energy development, grazing, and recreation. In addition some of the historic habitat available to sage-grouse within this population has transitioned to pinyon-juniper woodlands. Miller and Tausch (2001) estimated that the area of pinyon-juniper woodlands has increased approximately 10-fold throughout the western United States since the late 1800s. Additionally, Wisdom *et al.* (2005) determined that 35 percent of the sagebrush area in the eastern Great Basin is at high risk to future displacement by pinyon-juniper woodlands and that mountain big sagebrush appeared to be most at risk, which could have meaningful impacts to sage-grouse brood rearing habitats within the upper elevations of mountain ranges within this region. In addition to this threat, much of the Great Basin is also susceptible to sagebrush displacement by cheatgrass. The most at risk vegetative community in this region is Wyoming basin big sagebrush (Wisdom *et al.* 2005) located predominately within the lower elevation benches of mountain ranges. In some areas, this condition has already been realized and the future risk for existing sagebrush habitats is moderate to high. This threatens both breeding and winter habitats for sage-grouse. For example, in a study conducted within this region (in Eureka County, NV), Blomberg *et al.* (2012) determined that sage-grouse leks that were not impacted by exotic grasslands experienced recruitment levels that were six times greater than those impacted by exotic grasslands. Additionally, this study found that drought is a major contributor to reduced recruitment and low population growth within the Southern Great Basin. Other threats such as mining and infrastructure have the potential to affect this sage-grouse population due to mine expansions, as well as new mines and the infrastructure associated with them. Existing mining claims are virtually ubiquitous throughout the Southern Great Basin PAC. Overall, sage-grouse in the Southern Great Basin in Nevada are potentially at-risk.

## Alternative A - No Action

### Vegetation and Soils – Direct and Indirect Effects

In parts of the sub-region, invasive species such as cheatgrass or native species such as pinyon or juniper have replaced desirable dominant species. Invasive plants are thought to alter plant community structure and composition, productivity, nutrient cycling, and hydrology, and may competitively exclude native plant populations. Cheatgrass competes with native grasses and forbs that are important components of Greater Sage-Grouse (GRSG) habitat. Invasive species cause direct degradation of sagebrush habitats resulting in effects on local GRSG populations by affecting forage, cover quality and composition, increased wildfire frequency and intensity (see *Fire and Fuels* discussion below), with the potential to cause complete avoidance. As discussed below in *Fire and Fuels*, the encroachment of pinyon and juniper from higher elevations into sagebrush habitats can have a negative impact on GRSG habitat. Expansion of conifer woodlands also threatens GRSG populations because they do not provide suitable habitat and trees displace shrubs, grasses and forbs, required for GRSG through competition for resources. Juniper expansion is also associated with increased bare ground and the potential for erosion, as well as an increase in perch sites for raptors and raptor predation threats.

To reduce the likelihood of invasive weed spread and the extent of current infestations, integrated weed management techniques, including mechanical, manual, chemical, and biological control are utilized. Implementation of the above policies and plans would improve vegetation management by decreasing invasive species, provide for native vegetation establishment in sagebrush habitat, reduce the risk of wildfire, and restore fire-adapted ecosystems and repair lands damaged by fire. Mechanical juniper and pinyon pine treatments would result in short-term disturbances of soils and sagebrush due to heavy equipment, skid trails and temporary roads. Mechanical and manual treatments would also increase noise, vehicular traffic and human presence. However, once the site potential is restored there would be an increase in forage, cover quality and composition, reduction in predator perches, decrease in fire spread and intensity and a potential increase in water availability.

### Cumulative Effects

The baseline date for the cumulative impacts analysis for Greater Sage-Grouse is 2012. The temporal scope of this analysis is a 20-year planning horizon; land use planning documents are generally evaluated on a 5-year cycle. The temporal boundary for cumulative effects analysis for Greater Sage-Grouse includes Western Association of Fish and Wildlife Agencies (WAFWA) Management Zones III (Southern Great Basin), IV (Snake River Plain), and V (Northern Great Basin) (Figure 2) which comprise Greater Sage-Grouse habitat in the state of Nevada.

Under Alternative A, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), current vegetation and soils management treatments, including mechanical, manual, chemical, and biological control of invasive plants and pinyon and juniper, would continue and the short-term negative impacts of these activities on GRSG and GRSG habitats would continue to be outweighed by the long-term beneficial impacts, including increased forage, cover quality and composition, reduced predator perches, decreased fire spread and intensity and potentially increased water availability. Therefore, the direct and indirect effects of vegetation and soils management to Greater Sage-Grouse in Management Zones III, IV and V from the management

actions under Alternative A, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to Greater Sage-Grouse.

#### Livestock Grazing – Direct and Indirect Effects

Livestock grazing can affect soils, vegetation, water and nutrient availability by consuming or altering vegetation, redistributing nutrients and plant seeds, trampling soils and vegetation, and disrupting microbial composition (Connelly et al. 2004, ch.7). At unsustainable levels of grazing, negative impacts to GRSG can include loss of vegetative cover, reduced water infiltration rates, decreased plant litter, increased bare ground, reduced nutrient cycling, decreased water quality, increased soil erosion, and reduced overall habitat quality for wildlife, including GRSG. Properly managed grazing, however, may protect GRSG habitat by reducing fuel loads. Structural range improvements such as fences represent potential movement barriers (especially woven-wire fences), predator perches or travel corridors, and are a potential cause of direct mortality to GRSG.

Under Alternative A, livestock grazing would continue to be managed through existing grazing plans, with methods and guidelines from the existing plans followed to maintain ecological conditions according to Standards for Rangeland Health, which include maintaining healthy, productive and diverse populations of native plants and animals. Riparian habitats would be managed to achieve standards. Range improvements would be designed to meet both wildlife and range objectives, and would include building or modifying fences to permit passage of wildlife and reduce the chance of bird strikes, use of off-site water facilities, and in some cases modification or removal or improvements not meeting resource needs. Modifications may involve moving troughs, adding or changing wildlife escape ramps, or ensuring water is available on the ground for a various different wildlife species. Although not directly created to protect GRSG, these approaches would protect and enhance GRSG habitat by reducing the likelihood of surface disturbance in sensitive areas and ensuring brood rearing habitat is available to GRSG.

#### Cumulative Effects

Although livestock grazing occurs throughout all management zones, in the DEIS it is only considered a “lesser threat” with respect to “relative cumulative actions” and only for Management Zone V (see Chapter 5 of the DEIS). In addition, portions of Management Zone III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories which have the potential to compound the effects of livestock grazing on these lands; Forest Service-administered lands within Management zones IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); see Chapter 5 of the DEIS].

Under Alternative A, within Management Zones III, IV and V, livestock grazing would continue to be managed through existing grazing plans, with methods and guidelines from the existing plans followed to maintain ecological conditions according to Standards for Rangeland Health, which include maintaining healthy, productive and diverse populations of native plants and animals. Wild horses and burro Territories would be managed for Appropriate Management Level (refer to *Wild Horse and Burro Management* section below) and healthy populations of

wild horse and burros to achieve a thriving natural ecological balance with respect to wildlife, livestock use, and other multiple uses. Therefore, the direct and indirect effects of livestock grazing and wild horse and burro management to Greater Sage-Grouse in Management Zones III, IV and V from the management actions under Alternative A, which would be largely neutral for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to Greater Sage-Grouse.

#### Fire and Fuels – Direct and Indirect Effects

Fire is particularly problematic in sagebrush systems because it kills sagebrush plants and, in some cases, re-burns before sagebrush has a chance to re-establish. Fire is a primary threat to GRSG populations where increasing exotic annual grasses, primarily cheatgrass, are resulting in sagebrush loss and degradation. Without fire, cheatgrass dominance can exclude sagebrush seedlings from establishing. With fire, areas can be converted to annual grasslands. Without shrubs and a diversity of grasses and forbs, such annual grasslands will not support GRSG and populations could be displaced. In degraded GRSG habitats where cheatgrass is dominant under the sagebrush canopy, the habitat may be adequate winter habitat or provide adequate cover for nesting. However, these areas may lack the understory forb diversity and insect abundance necessary for brood-rearing and could result in lower chick survival. As GRSG habitats become smaller and less connected to adjacent GRSG populations, they become increasingly susceptible to stochastic events, local extirpation and genetically isolation that can cause inbreeding depression.

Another factor affecting fire in some sagebrush sites is the encroachment of pinyon and juniper trees from higher elevations into sagebrush habitats. Under suitable conditions, wildfires that start in pinyon and juniper stands can move into Wyoming big sagebrush stands. In the absence of cheatgrass, Wyoming sagebrush sites can take 150 years to recover. Where cheatgrass is present, fire can open the site to invasion of annual grasses described above.

The cheatgrass fire cycle causes GRSG habitat loss and degradation on an annual basis. Currently, due to the extent of the threat, there are no management actions that can effectively alter this trend. Facilitation of the spread of cheatgrass and the likelihood of ignition through BLM and Forest Service-authorized programs is further discussed in the *Lands and Realty Management, Energy and Locatable Minerals Development and Travel, Transportation and Recreation* sections.

Alternative A would continue to manage fire suppression and fuels management under current direction. Policies would not prioritize protection or restoration of mature sagebrush habitat. Under Alternative A, wildfires would likely continue to increase in size and frequency in Greater Sage-Grouse habitats and those habitats would subsequently continue to be degraded or lost. Small and heavily disturbed populations with dominance of invasive annual grass understory would be particularly susceptible to these impacts. Additionally, there may be some direct and indirect effects to individual Greater Sage-Grouse from direct mortality or disturbance due to fire suppression or fuels treatment activities. Increased human activity and noise associated with wildland fire suppression or fuels treatments in areas occupied by sage-grouse can disrupt nesting, breeding, or foraging behavior. Important habitats can be removed or degraded because of the use of heavy equipment or hand tools. Other potential impacts may include injuring or killing eggs/chicks, or causing changes in species movement patterns due to areas devoid of vegetation.

## Cumulative Effects

Current wildfire suppression operations and fuels management activities would continue under Alternative A. The limitation or prohibition of the use of prescribed fire in sagebrush habitats and the sagebrush protection emphasis during wildland fire operations would not be instituted as they would be in Alternatives B, C, D, E and F. Under Alternative A, the direct and indirect effects, in conjunction with the past, present and reasonably foreseeable future actions and the likelihood of increasing future fires from annual weed invasions and predicted climate change, may result in the increased loss and fragmentation of the existing sagebrush habitat from wildfire in Management Zones III, IV and V (refer to Chapter 5 of the DEIS).

### Wild Horse and Burro Management – Direct and Indirect Effects

While not as widespread as livestock grazing, wild horse and burro management is still a major land use across the sagebrush biome. Equid grazing results in a reduction of shrub cover and more fragmented shrub canopies, which can negatively affect GRSG habitat (Beever and Aldridge 2011). Additionally, sites grazed by free-roaming equids have a greater abundance of annual invasive grasses, reduced native plant diversity and reduced grass density (Beever and Aldridge 2011). Effects of wild equids on habitats may also be more pronounced during periods of drought or vegetation stress (NTT 2011, pg 18).

Fences associated with wild horse and burro management represent potential movement barriers, predator perches or travel corridors, and are a potential cause of direct mortality to GRSG. In addition to the impacts of fencing on GRSG, The Wild and Free-Roaming Horses and Burros Act of 1971 requires that water must also be available yearlong in horse management areas. This often leads to riparian areas receiving yearlong use by horses or riparian areas being modified with additional fencing and troughs in order to accommodate yearlong horse use. The range improvements would result in increased potential perch sites, less water available on the ground, and possibly have negative effects to riparian habitat depending on how each facility is constructed. According to Berger (1986), one measure of habitat quality for horses is the presence of meadows. Horse bands that spent more time foraging in meadows had higher reproductive success and meadows received the highest use in proportion to their availability. At levels higher than Appropriate Management Level (AML), impacts can lead to loss of vegetative cover, decreased water quality, increased soil erosion, and reduced overall habitat quality for wildlife, including Greater Sage-Grouse.

Within the Sub-region, all Forest Service districts manage for wild horses and/or burros within established Territories. Under current direction, overall direction is to manage for healthy populations of wild horse and burros to achieve a thriving natural ecological balance with respect to wildlife, livestock use, and other multiple uses. All Forest Service Territories are managed for AML. Initially, AML is established in Land and Resource Management Plans at the outset of planning and is adjusted based on monitoring data throughout the life of the plan. Priorities for gathering horses to maintain AML are based on population inventories, gather schedules, and budget. Gathers are also conducted in emergency situations when the health of the population is at risk for lack of forage or water. Direction for prioritizing horse gathers and maintaining AML is not based on GRSG habitat needs, although this is implicit in the Congressional directive to maintain a thriving natural ecological balance. Under Alternative A, there are no GRSG goals,

objectives, or management actions specifically identified within the management framework for the Wild Horse and Burro program.

#### Cumulative Effects

Portions of Management Zone III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories. Forest Service-administered lands within Management zones IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); see Chapter 5 of the DEIS]. Although livestock grazing occurs throughout all management zones, and has the potential to compound the effects of wild horse and burro management on these lands, in the DEIS it is only considered a “lesser threat” with respect to “relative cumulative actions” and only for Management Zone V (see Chapter 5 of the DEIS).

Under Alternative A, within Management Zone III, wild horse and burro Territories would be managed for Appropriate Management Level (refer to Wild Horse and Burro Management section below) and healthy populations of wild horse and burros to achieve a thriving natural ecological balance with respect to wildlife, livestock use, and other multiple uses. Within Management Zones III, IV and V, livestock grazing would continue to be managed through existing grazing plans, with methods and guidelines from the existing plans followed to maintain ecological conditions according to Standards for Rangeland Health, which include maintaining healthy, productive and diverse populations of native plants and animals. Therefore, the direct and indirect effects of wild horse and burro management and livestock grazing to Greater Sage-Grouse in Management Zones III, IV and V from the management actions under Alternative A, which would be largely neutral for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to Greater Sage-Grouse.

#### Energy and Locatable Minerals Development – Direct and Indirect Effects

Minerals development within the sub-region consists of locatable mineral resources at various scales. Mining is primarily for gold, silver, and copper and is largely absent from the basalt-capped areas of northwestern Nevada. Leasable minerals include mineral material sales such as sand and gravel for road maintenance, and limited additional commodities such as potash. Oil and gas is in limited production occurring only in the far southeastern sub-region. Oil and gas leasing occurs over a much larger footprint in western Nevada and additional production is projected as new technologies expand recovery potential. Development of locatable and leasable mineral resources typically requires significant infrastructure and human activity for construction, operation, and maintenance.

Within the sub-region, most public lands are open to oil and gas leasing, saleable mineral material development, and solar development, although specific closures of areas to leasing such as Areas of Critical Environmental Concern (ACECs) or crucial or essential wildlife habitat exist throughout the sub-region. Lands within the sub-region are generally open to mineral location. There are specific locatable mineral withdrawals for particular rights of way, designated wilderness areas, areas of critical environmental concern and other administrative needs, none specific to protecting Greater Sage-Grouse habitat. All locatable mineral activities are managed under the regulations at 43 CFR 3800 through approval of a Plan of Operations. Mitigation of

effects to GRSG and its habitat are identified through the NEPA process approving plans of operation. Goals and objectives for locatable minerals are to provide opportunities to develop the resource while preventing undue or unnecessary degradation of public lands. Within the sub-region, most areas of public land would remain open for wind development.

Under Alternative A, all energy and locatable minerals development and associated infrastructure, including power lines, roads, buildings, fences, wind turbines, solar panels, and others, would continue to be managed under current direction. As such, this alternative would be expected to cause the greatest amount of direct and indirect impacts on GRSG and their habitat including habitat loss, degradation, and fragmentation by roads, pipelines and power lines, higher levels of noise, increased presence of roads/humans, and a larger number of anthropogenic structures in an otherwise open landscape that could result in abandonment of leks, decreased attendance at the leks that do persist, lower nest initiation, poor nest success, decreased yearling survival, and avoidance of energy infrastructure and ancillary facilities in important wintering habitat. Please also refer to the *Land Uses and Realty Management* section below.

#### Cumulative Effects

Energy development is currently a minor threat present only in Management Zone III but geothermal energy development potential is high throughout Management Zone IV (refer to Chapter 5 of the DEIS). Mining is common across Management Zones III and IV in Nevada and occurs at a variety of scales. Management under Alternative A would maintain the current acreage open to leasing of fluid minerals, without stipulations, and locatable mineral development, although areas closed to these activities under Alternative A include some existing ACEC designations, designated wilderness, and wilderness study areas. Current energy and minerals development activities would continue under Alternative A. The closure of areas to fluid minerals and other energy development and withdrawal of areas from mineral entry would not be instituted as they would be in Alternatives B, C, D and F. Therefore, under Alternative A, the direct and indirect effects of energy and locatable minerals development, in conjunction with the past, present and reasonably foreseeable future actions, may result in the increased loss and fragmentation of the existing sagebrush habitat from energy and locatable minerals development in Management Zones III, IV or V (refer to Chapter 5 of the DEIS).

#### Land Uses and Realty Management – Direct and Indirect Effects

Under Alternative A, land tenure adjustments would be subject to current disposal/exchange/acquisition criteria, which include retaining lands with threatened or endangered species, high quality riparian habitat, or plant and animal populations or natural communities of high interest. Although land tenure adjustments or withdrawals made in GRSG habitat could reduce the habitat available to sustain GRSG populations, unless provisions were made to ensure that GRSG conservation remained a priority under the new land management regime, land tenure adjustments would likely include retention of areas with GRSG, and would thus retain occupied habitats under BLM or FS management. This would reduce the likelihood of habitat conversion to agriculture, urbanization, or other uses that would remove sagebrush habitat.

Existing Land and Resource Management Plan direction would apply under Alternative A. There would be no changes to the current National Forest System infrastructure including power lines,

wind turbines, solar panels, communications towers, fences, or roads. Although mitigation is typically developed under the NEPA process and most right of way and surface developments are subject to limited operation periods or other stipulations in local GRSG conservation strategies, permitted right-of-ways (ROWs) or special use authorities (SUAs) would continue to allow construction, maintenance, and operation activities that could result in habitat loss, fragmentation, or degradation of GRSG habitat or result in barriers to migration corridors or seasonal habitats. Construction, maintenance, and use of infrastructure and ancillary facilities would continue to lead to higher short-term concentrations of human noise and disturbance that could cause disruption of nesting activities, abandonment of young or temporary displacement; these could also facilitate establishment and spread of cheatgrass and other invasive weeds (see discussion on *Vegetation and Soils*) and an increase in edge habitat. Existing and new power lines, wind turbines, solar panels, communications towers, fences, and vehicles traveling on associated roads would continue to pose a collision hazard to GRSG or to provide potential perching and/or nesting habitat for avian predators that could result in declines in lek attendance or nest success. Though most projects would be forced to mitigate or minimize impacts, this alternative would likely have the greatest impact on the GRSG and its habitat.

#### Cumulative Effects

Current lands and realty (i.e., infrastructure) management activities would continue under Alternative A. ROW exclusion or avoidance areas would not be instituted as they would be in Alternatives B, C, D, or F. Therefore, under Alternative A, the direct and indirect effects of lands and realty management, in conjunction with the past, present and reasonably foreseeable future actions, may result in the increased loss and fragmentation of the existing sagebrush habitat and disturbance to GRSG in Management Zones III, IV and V (refer to Chapter 5 of the DEIS).

#### Travel, Transportation and Recreation Management – Direct and Indirect Effects

Under current management, travel on most Forest Service-administered lands is limited to designated roads, although off road motorized big game retrieval within ½ mile of roads is authorized on the Mountain City, Ruby Mountains, and Jarbidge Ranger Districts of the Humboldt-Toiyabe National Forest, with some restrictions. Under Alternative A, there would be no changes to the current National Forest System Roads, transportation plan, or recreation management on these forests. There would be minimal seasonal restrictions on casual use and some of the areas within GRSG habitat would remain open to cross country travel. In general, the more acres and miles of routes that are designated in an area, the greater the likelihood of habitat fragmentation and introduction of invasive plants within GRSG habitat and disturbance on GRSG. In addition, less restrictive travel conditions usually mean higher concentrations of human use adjacent to motorized routes. This can cause disruption of nesting activities, abandonment of young and temporary displacement. Impacts from roads may include habitat loss from road construction, noise disturbance from vehicles, and direct mortality from collisions with vehicles. Roads may also present barriers to migration corridors or seasonal habitats. Although the majority of cross country travel for big game retrieval would occur outside of the GRSG lekking and breeding season limiting the potential for OHV-related disturbance impacts to GRSG, OHV use in these areas would still have the potential to fragment and introduce weeds into GRSG habitat. This alternative has the highest potential to impact GRSG due to the lack of restrictions on activities that cause these effects. Therefore all direct and indirect effects on the species and its habitat would likely cause current trends to continue.



### Cumulative Effects

Recreation is considered a “lesser threat” with respect to “relative cumulative actions” addressed in the DEIS and only for Management Zone V (see Chapter 5 of the DEIS). Current travel, transportation and recreation management would continue under Alternative A. The limitation of motorized travel to existing routes and permitting of recreational SUAs that are neutral or beneficial to sage-grouse, as well as limited opportunities for road construction and upgrading of current roads, would not be instituted as they would be in Alternatives B, C, D and F. Under Alternative A, the direct and indirect effects from travel, transportation and recreation management, in conjunction with the past, present and reasonably foreseeable future actions, may result in the increased loss and fragmentation of the existing sagebrush habitat in Management Zones III, IV and V (refer to Chapter 5 of the DEIS).

### **Alternative B**

#### Vegetation and Soils – Direct and Indirect Effects

Under Alternative B, weed control efforts and pinyon-juniper encroachment would continue to be managed under current direction (see Alternative A). However, GRSG vegetation management conservation measures included in Alternative B would benefit weed and conifer control efforts by prioritizing restoration efforts, including reducing invasive plants in PPH, in order to benefit GRSG habitats. BLM and Forest Service would require the use of native seeds and would design post-restoration management to ensure the long-term persistence of the restoration efforts, and would consider changes in climate when determining species for restoration. Invasive species would also be monitored and controlled after fuels treatments and at existing and new range improvements in PPH. Alternative B incorporates fewer invasive plant management measures in PGH compared to PPH. However, many of the same habitat restoration and vegetation management actions would be applied, including prioritizing the use of native seeds. Together, these measures would reduce impacts from invasive plants and pinyon-juniper encroachment on GRSG habitat described under Alternative A although the effects of the treatments would be the same.

### Cumulative Effects

Under Alternative B, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), current vegetation and soils management treatments, including mechanical, manual, chemical, and biological control of invasive plants and pinyon and juniper, would continue and the short-term negative impacts of these activities on GRSG and GRSG habitats would continue to be outweighed by the long-term beneficial impacts including increased forage, cover quality and composition, reduced predator perches, decreased fire spread and intensity and potentially increased water availability. However, additional emphasis on protecting existing sagebrush habitat, under Alternative B would provide an added benefit to GRSG habitat. Therefore, the direct and indirect effects of vegetation and soils management to Greater Sage-Grouse in Management Zones III, IV and V from the management actions under Alternative B, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to Greater Sage-Grouse.

### Livestock Grazing – Direct and Indirect Effects

Alternative B would implement a number of beneficial management actions in PPH to incorporate sage-grouse habitat objectives and management considerations into livestock grazing management. These include completion of Land Health Assessments, consideration of grazing methods and systems to reduce impacts on sage-grouse habitat, consideration of retiring vacant allotments, improved management of riparian areas and wet meadows, evaluation of existing introduced perennial grass seedings, authorization of new water developments and structural range improvements only when beneficial to GRSG, BMPs for West Nile Virus, and fence removal, modification or marking. Several management actions to reduce impacts from livestock grazing on sage-grouse general habitat would be incorporated, including the potential to modify grazing systems to meet seasonal sage-grouse habitat requirements and management to improve the conditions of riparian areas and wet meadows. Together these efforts would reduce the impacts from grazing on GRSG described under Alternative A.

### Cumulative Effects

Although livestock grazing occurs throughout all management zones, in the DEIS it is only considered a “lesser threat” with respect to “relative cumulative actions” and only for Management Zone V (see Chapter 5 of the DEIS). In addition, portions of Management Zone III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories which have the potential to compound the effects of livestock grazing on these lands. Forest Service-administered lands within Management zones IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); see Chapter 5 of the DEIS].

Under Alternative B, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), livestock grazing would continue to be managed through existing grazing plans and wild horse and burro Territories would be managed for Appropriate Management Level. However, additional emphasis on protecting existing sagebrush habitat under Alternative B would provide an added benefit to GRSG habitat. Therefore, the direct and indirect effects of livestock grazing and wild horse and burro management to Greater Sage-Grouse in Management Zones III, IV and V from the management actions under Alternatives B, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to Greater Sage-Grouse.

### Fire and Fuels – Direct and Indirect Effects

Under Alternative B, suppression would be prioritized in PPH to protect mature sagebrush habitat. Suppression would be prioritized in PGH only where fires threaten PPH. Alternative B does not include any other specific management for wildland fire management in PGH. Fuels treatments would be designed to protect sagebrush ecosystems by maintaining sagebrush cover, implementing fuel breaks, applying seasonal restrictions, protections for winter range, and requiring use of native seeds. Post-fuels treatments in PPH would be designed to ensure long-term persistence of seeded areas and native plants and maintain 15 percent canopy cover. Fuels treatments in PPH would also monitor and control for invasive species, and fuels management BMPs would incorporate invasive plant prevention measures. Overall, these conservation measures would reduce the threat of wildfire to sagebrush compared to Alternative A though, in

general, the effects of fire suppression and fuels treatments would be similar to those of Alternative A.

#### Cumulative Effects

Management actions under Alternative B with regard to fire would increase protection of Greater Sage-Grouse habitat, primarily within PPH, thereby benefitting Greater Sage-Grouse rather than removing or fragmenting habitat. Under Alternative B, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), current wildfire suppression operations would continue, however, additional emphasis on protecting existing sagebrush habitat during suppression activities and pre-suppression planning and staging for maximum protection of Greater Sage-Grouse habitat would be included. Fuels treatment activities would focus on protecting Greater Sage-Grouse habitat, primarily within PPH. Therefore, the direct and indirect effects of fire to Greater Sage-Grouse in Management Zones III, IV and V from the management actions under Alternative B, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to Greater Sage-Grouse.

#### Wild Horse and Burro Management – Direct and Indirect Effects

Under Alternative B, wild horses and burros would be managed at AML on the same number of acres as Alternative A, with gathers prioritized based on PPH habitat and emergency environmental issues. Wild Horse Territory (WHT) Plans would incorporate GRSG habitat objectives in PPH. Land health assessments to determine existing structure/condition/composition of vegetation within all Territories would be conducted. Implementation of any range improvements in PPH would follow the same guidance as identified for livestock grazing in this alternative including designing and locating new improvements only where they “conserve, enhance, or restore GRSG habitat through improved grazing management”. Design features could include treating invasive species associated with range improvements. Additional range improvements in PPH would specifically address the needs of GRSG. In comparison to Alternative A, Alternative B would prioritize GRSG habitat objectives in WHT Plans and base AML numbers on GRSG habitat needs.

#### Cumulative Effects

Portions of Management Zone III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories. Forest Service-administered lands within Management zones IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); see Chapter 5 of the DEIS]. Although livestock grazing occurs throughout all management zones, and has the potential to compound the effects of livestock grazing on these lands, in the DEIS it is only considered a “lesser threat” with respect to “relative cumulative actions” and only for Management Zone V (see Chapter 5 of the DEIS).

Under Alternative B, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), wild horse and burro Territories would continue to be managed for Appropriate Management Level and livestock grazing would continue to be managed through existing grazing plans. However, additional emphasis on protecting existing sagebrush habitat under Alternative B would provide an added benefit to GRSG habitat. Therefore, the direct and indirect effects of

livestock grazing and wild horse and burro management to Greater Sage-Grouse in Management Zones III, IV or V from the management actions under Alternative B, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to Greater Sage-Grouse.

#### Energy and Locatable Minerals Development – Direct and Indirect Effects

Under this Alternative, PPH would be closed to new fluid mineral leasing, nonenergy leasable mineral leasing, and mineral material sales, and it would be proposed for withdrawal from mineral entry. In addition, mandatory BMPs would be applied as conditions of approval on fluid mineral leases. No surface occupancy (NSO) would be stipulated for leased fluid minerals within PPH. A 3% disturbance cap to activities in PPH would be applied and numerous conservation measures would be implemented to reduce impacts from mineral exploration and development activities in PPH. These measures would reduce the impacts of energy development on GRSG and GRSG PPH described under Alternative A.

Alternative B does not include specific management for fluid, saleable, locatable, and nonenergy leasable minerals in PGH or wind energy or solar energy development in PPH or PGH. As a result, current trends would continue and impacts would be similar to those under Alternative A. Although Alternative B does not directly address wind energy development or industrial solar development, its 3% threshold for anthropogenic disturbances (See *Land Uses and Realty Management*) would apply to energy development and would limit the extent of all types of energy development in PPH.

#### Cumulative Effects

Energy development is currently a minor threat present only in Management Zone III but geothermal energy development potential is high throughout Management Zone IV (refer to Chapter 5 of the DEIS). Mining is common across Management Zones III and IV in Nevada and occurs at a variety of scales. Management actions associated with energy and locatable minerals development under Alternative B would increase protection of Greater Sage-Grouse habitat, primarily within PPH, thereby benefitting Greater Sage-Grouse rather than removing or fragmenting habitat. Under Alternative B, within Management Zones III and IV, some of the current energy and locatable minerals management direction would continue, however, additional emphasis on protecting existing sagebrush habitat by adding all PPH to existing closures and proposing it for withdrawal would be included. Therefore, the direct and indirect effects of to Greater Sage-Grouse in Management Zones III, IV and V from the management actions associated with energy and locatable minerals development under Alternative B, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to Greater Sage-Grouse.

#### Land Uses and Realty Management – Direct and Indirect Effects

Under this alternative, all PPH would be managed as exclusion areas and PGH would be managed as an avoidance area for new ROW and SUA projects and co-location of new ROWs or SUAs with existing infrastructure would occur in PPH and PGH. It would also include the following within PPH: co-location of new ROWs or SUAs with existing infrastructure; removal, burying, or modification of existing power lines; co-location of new facilities with existing

facilities, where possible; use of existing roads, or realignments to access valid existing rights that are not yet developed or constructing new roads to the absolute minimum standard necessary if valid existing rights could not be accessed via existing roads; and a 3% threshold on anthropogenic disturbance (including, but not limited to, highways, roads, geothermal wells, wind turbines, and associated facilities) within PPH.

In addition, Alternative B would contain provisions to retain public ownership of priority sage-grouse habitat and to acquire state and private lands with intact subsurface mineral estate where suitable conservation actions for GRSG could not otherwise be achieved. This alternative would benefit GRSG by maximizing connectivity and minimizing loss, fragmentation, degradation and disturbance of sagebrush habitats within PPH by power lines, communication towers and roads. GRSG and GRSG habitat outside PPH would likely experience little change in direct or indirect effects. However, if the 3% development threshold ended up concentrating new infrastructure development outside PPH rather than just reducing it within PPH, the extent of impacts on GRSG and GRSG habitat outside PPH could increase under Alternative B relative to Alternative A. Alternative B would reduce the likelihood of collisions addressed in Alternative A. These conservation measures make this alternative more protective than Alternative A, although the general effects would be the same.

#### Cumulative Effects

Management actions associated with lands and realty under Alternatives B would increase protection of Greater Sage-Grouse habitat, thereby benefitting Greater Sage-Grouse rather than removing or fragmenting habitat. Under Alternative B, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), some of the current land and realty operations would continue, however, additional emphasis on protecting existing sagebrush habitat and preventing disturbance to GRSG would be included. Lands and realty management activities would focus ROW exclusion or avoidance areas in Greater Sage-Grouse habitat. Therefore, the direct and indirect effects of lands and realty management to Greater Sage-Grouse in Management Zones III, IV and V under Alternative B, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions, would not substantially increase impacts to Greater Sage-Grouse.

#### Travel, Transportation and Recreation Management – Direct and Indirect Effects

Under Alternative B, motorized travel in PPH would be limited to designated roads, primitive roads, and trails at a minimum. Only recreational SUAs that are neutral or beneficial to sage-grouse would be permitted in PPH and there would be limited opportunities for road construction in PPH, with minimum standards applied and no upgrading of current roads. Although general impacts would be the same as Alternative A, Alternative B is more restrictive than Alternative A and it would reduce loss, fragmentation and disturbance to GRSG leks and nesting habitat by limiting motorized travel to designated routes, minimizing human use and road construction or upgrades and reducing automotive collisions with individual birds.

#### Cumulative Effects

Recreation is considered a “lesser threat” with respect to “relative cumulative actions” addressed in the DEIS and only for Management Zone V (see Chapter 5 of the DEIS). Management actions associated with travel, transportation and recreation under Alternative B would increase

protection of Greater Sage-Grouse habitat, primarily within PPH, thereby benefitting Greater Sage-Grouse rather than removing or fragmenting habitat. Under Alternative B, within Management Zones III, IV and V, some of the current travel, transportation and recreation management direction would continue, however, additional emphasis on protecting existing sagebrush habitat would be included. Therefore, the direct and indirect effects of travel, transportation and recreation management to Greater Sage-Grouse in Management Zones III, IV and V under Alternative B, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to Greater Sage-Grouse.

## **Alternative C**

### Vegetation and Soils – Direct and Indirect Effects

Alternative C would maintain the direction described under Alternative A for weed control and pinyon-juniper encroachment and include additional provisions that would limit invasive weed spread in all occupied GRSG habitat. Vegetation management would benefit weed control efforts, by prioritizing restoration, including reducing invasive plants, in order to benefit sage-grouse habitats. In all cases, local native plant ecotype seeds and seedlings would be used. These policies would reduce impacts from invasive plants described under Alternative A and have similar impacts associated with treatment, but would include additional conservation measures specific to limiting the spread of invasive plants. In addition, grazing would be eliminated within all occupied sage-grouse habitat, eliminating the potential for invasive plant spread by livestock. This would make Alternative C more protective of GRSG and GRSG habitat than Alternatives A or B.

### Cumulative Effects

Under Alternative C, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), current vegetation and soils management treatments, including mechanical, manual, chemical, and biological control of invasive plants and pinyon and juniper, would continue and the short-term negative impacts of these activities on GRSG and GRSG habitats would continue to be outweighed by the long-term beneficial impacts including increased forage, cover quality and composition, reduced predator perches, decreased fire spread and intensity and potentially increased water availability. However, additional emphasis on protecting existing sagebrush habitat under Alternative C would provide an added benefit to GRSG habitat. Therefore, the direct and indirect effects of vegetation and soils management to Greater Sage-Grouse in Management Zones III, IV and V from the management actions under Alternative C, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to Greater Sage-Grouse.

### Livestock Grazing – Direct and Indirect Effects

Under Alternative C, grazing would be eliminated within all occupied sage-grouse habitat (PPH and PGH) reducing both the negative and positive grazing-related impacts on GRSG and GRSG habitat discussed under Alternative A more so than any of the other alternatives. No new water developments or range improvements would be constructed in occupied habitat and only habitat

treatments that benefit GRSG would be allowed. Retirement of grazing would be allowed and fast tracked.

#### Cumulative Effects

Although livestock grazing occurs throughout all management zones, in the DEIS it is only considered a “lesser threat” with respect to “relative cumulative actions” and only for Management Zone V (see Chapter 5 of the DEIS). Under Alternative C, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), livestock grazing would be eliminated within all occupied GRSG habitat, providing a net benefit to GRSG habitat. Therefore, the direct and indirect effects of livestock grazing to Greater Sage-Grouse in Management Zones III, IV and V from management under Alternative C, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to Greater Sage-Grouse.

#### Fire and Fuels – Direct and Indirect Effects

Alternative C is similar to Alternative B except that it is more protective of GRSG and GRSG habitat because prioritization of suppression would apply to PGH in addition to PPH (i.e., All Occupied Habitat), it includes measures to manage vegetation for good or better ecological condition, and it focuses fuel breaks on areas of human habitation or significant disturbance. The general effects of fire suppression and fuels treatments would be similar to those of Alternative A.

#### Cumulative Effects

The cumulative effect of management actions related to fire and fuels under Alternative C, when combined with the past, present and reasonably foreseeable future actions are similar to the cumulative effects described in Alternative B, and are not expected to be substantial, change the existing population trend, or remove and fragment sagebrush habitat past a critical threshold within Management Zones III, IV and V (refer to Chapter 5 of the DEIS).

#### Wild Horse and Burro Management – Direct and Indirect Effects

Under Alternative C, wild horses and burros would be managed at AML. However, AML establishment would be analyzed in conjunction with livestock numbers during grazing permit renewals. Combined with the removal of some fences during “active restoration” processes related to livestock grazing, horses and burros would be expected to range over a larger area than in Alternative A and would necessitate the need for increased gather schedules. The increase in access to riparian and upland habitats that are currently protected by fences, and expected temporary increases in horses and burros over AML, could over time reduce food and cover for GRSG and change water holding capacities of riparian brood rearing sites compared to Alternative A, although needs of GRSG would be fully considered as part of the AML establishment process.

#### Cumulative Effects

Portions of Management Zone III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories. Forest Service-administered lands within Management zones IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); see Chapter 5 of the DEIS]. Under Alternative C, wild horse and burro Territories would be

managed for AML as under current management, however, there would be fewer restrictions on wild horse and burro movement than under Alternative A. Therefore, the direct and indirect effects of wild horse and burro management under Alternative C, in conjunction with the past, present and reasonably foreseeable future actions, may result in the increased loss and fragmentation of the existing sagebrush habitat in Management Zones III, IV and V (refer to Chapter 5 of the DEIS).

#### Energy and Locatable Minerals Development – Direct and Indirect Effects

Alternative C would expand several of the protections under Alternative B to all occupied habitat as well as prohibit new exploration permits for unleased fluid minerals (also see *Land Uses and Realty Management* below). Like Alternative B, the conservation measures proposed under Alternative C would reduce the impacts of energy and locatable minerals development on GRSG described under Alternative A, but to a larger degree than any of the other alternatives.

#### Cumulative Effects

Energy development is currently a minor threat present only in Management Zone III but geothermal energy development potential is high throughout Management Zone IV (refer to Chapter 5 of the DEIS). Mining is common across Management Zones III and IV in Nevada and occurs at a variety of scales. Management actions under Alternative C with regard to energy and locatable minerals development would increase protection of all occupied habitat, thereby benefitting Greater Sage-Grouse rather than removing or fragmenting habitat. Under Alternative C, within Management Zones III and IV, some of the current energy and locatable minerals management direction would continue, however, additional emphasis on protecting existing sagebrush habitat by adding all occupied habitat to existing closures and proposing it for withdrawal would be included. Therefore, the direct and indirect effects of fire to Greater Sage-Grouse in Management Zones III, IV and V from the management actions under Alternative C, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to Greater Sage-Grouse (refer to Chapter 5 of the DEIS).

#### Land Uses and Realty Management – Direct and Indirect Effects

Alternative C would have the most protective measures for GRSG. Alternative C would extend many of the Alternative B conservation measures to all occupied habitat and all occupied habitat would be managed as an exclusion area for new ROW projects. As a result, management under Alternative C would encourage consolidation of sage-grouse habitats, facilitating habitat conservation and management and reduce the impacts of infrastructure on GRSG described under Alternatives A and B in a wider area than Alternative B.

Unlike Alternative B, which would permit wind energy siting in PPH provided a development disturbance threshold of 3% were not exceeded, Alternative C would not permit wind energy development siting in all occupied GRSG habitat. This would reduce the effects of wind energy on GRSG as discussed under Alternative A more so than Alternative B.

#### Cumulative Effects

Management actions associated with lands and realty under Alternative C would increase protection of Greater Sage-Grouse habitat, thereby benefitting Greater Sage-Grouse rather than



removing or fragmenting habitat. Under Alternative C, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), some of the current land and realty operations would continue, however, additional emphasis on protecting existing sagebrush habitat and preventing disturbance to GRSG would be included. Lands and realty management activities would focus ROW exclusion or avoidance areas in Greater Sage-Grouse habitat. Therefore, the direct and indirect effects of lands and realty management to Greater Sage-Grouse in Management Zones III, IV and V under Alternative C, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to Greater Sage-Grouse.

#### Travel, Transportation and Recreation Management – Direct and Indirect Effects

Alternative C is similar to Alternative B except that it would apply to all occupied habitat and, therefore, protect a larger area of GRSG habitat than Alternative B from the same types of general recreational impacts described in Alternative A.

#### Cumulative Effects

Recreation is considered a “lesser threat” with respect to “relative cumulative actions” addressed in the DEIS and only for Management Zone V (see Chapter 5 of the DEIS). Management actions associated with travel, transportation and recreation under Alternative C would increase protection of all occupied Greater Sage-Grouse habitat, thereby benefitting Greater Sage-Grouse rather than removing or fragmenting habitat. Under Alternative C, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), some of the current travel, transportation and recreation management direction would continue, however, additional emphasis on protecting existing sagebrush habitat would be included. Therefore, the direct and indirect effects of travel, transportation and recreation management to Greater Sage-Grouse in Management Zones III, IV and V under Alternative C, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to Greater Sage-Grouse.

### **Alternative D**

#### Vegetation and Soils – Direct and Indirect Effects

Alternative D would treat sites within priority and general sage-grouse habitat that are dominated by invasive species through an IVM approach using fire, chemical, mechanical and biological methods based on site potential. Targeted grazing would be allowed to suppress cheatgrass or other vegetation that are hindering achieving sage-grouse objectives in priority and general habitat. Sheep, cattle, or goats may be used as long as the animals are intensely managed and removed when the utilization of desirable species reaches 35%. In perennial grass, invasive annual grass, and conifer-invaded cover types, sagebrush steppe would be restored with sagebrush seedlings where feasible.

Pinyon and juniper treatment in encroached sagebrush vegetation communities in priority habitat and general habitat would focus on enhancing, reestablishing, or maintaining habitat components (e.g. cover, security, food, etc.) in order to achieve habitat objectives. Phase II and III pinyon and/or juniper stands would be removed or reduced in biomass to meet fuel and sage-grouse habitat objectives and appropriate action would be taken to establish desired understory species

composition, including seeding and invasive species treatments. Treatment methods that maintain sagebrush and shrub cover and composition would be used in areas with a sagebrush component.

Alternative D would be more protective of GRSG habitat than Alternative B because it contains several conservation measures specifically targeted to invasive species infestations and pinyon-juniper encroachment and it would apply them over a larger area (within priority and general habitat) than Alternative B (only PPH).

#### Cumulative Effects

Under Alternative D, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), current vegetation and soils management treatments, including mechanical, manual, chemical, and biological control of invasive plants and pinyon and juniper, would continue and the short-term negative impacts of these activities on GRSG and GRSG habitats would continue to be outweighed by the long-term beneficial impacts including increased forage, cover quality and composition, reduced predator perches, decreased fire spread and intensity and potentially increased water availability. However, additional emphasis on protecting existing sagebrush habitat under Alternative D would provide an added benefit to GRSG habitat. Therefore, the direct and indirect effects of vegetation and soils management to Greater Sage-Grouse in Management Zones III, IV and V from the management actions under Alternative D, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to Greater Sage-Grouse.

#### Livestock Grazing – Direct and Indirect Effects

Alternative D, similar to Alternative B, would implement a number of beneficial management actions to incorporate sage-grouse habitat objectives and management considerations into livestock grazing management: consideration of grazing methods and systems to reduce impacts on sage-grouse habitat, consideration of retiring vacant allotments, improved management of riparian areas and wet meadows, evaluation of existing introduced perennial grass seedings, authorization of new water developments and structural range improvements only when beneficial to GRSG, the potential to modify grazing systems to meet seasonal sage-grouse habitat requirements and fence removal, modification or marking. The main difference is that Alternative D would apply these conservation measures to priority and general habitat rather than limiting them to PPH as Alternative B would and Alternative D would not require the completion of Land Health Assessments to determine if standards of range-land health are being met as Alternative B would. These measures would reduce the negative impacts from grazing on GRSG described under Alternative A probably more so than Alternative B but less so than Alternative C that would eliminate livestock grazing in all occupied habitat.

#### Cumulative Effects

Although livestock grazing occurs throughout all management zones, in the DEIS it is only considered a “lesser threat” with respect to “relative cumulative actions” and only for Management Zone V (see Chapter 5 of the DEIS). In addition, portions of Management Zone III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories which have the potential to compound the effects of livestock grazing on these lands;

Forest Service-administered lands within Management zones IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); see Chapter 5 of the DEIS].

Under Alternative D, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), livestock grazing would continue to be managed through existing grazing plans and wild horse and burro Territories would be managed for Appropriate Management Level. However, additional emphasis on protecting existing sagebrush habitat under Alternative D would provide an added benefit to GRSG habitat. Therefore, the direct and indirect effects of livestock grazing and wild horse and burro management to Greater Sage-Grouse in Management Zones III, IV and V from the management actions under Alternative D, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions, would not substantially increase impacts to Greater Sage-Grouse.

#### Fire and Fuels – Direct and Indirect Effects

Unlike Alternative B, in which suppression would be prioritized in PPH, but only in PGH where fires threaten PPH, Alternative D would prioritize suppression in priority and general sage-grouse habitat. In priority and general habitat, fuels treatments emphasizing maintaining, protecting, and expanding GRSG habitat would be designed and implemented and would include measures similar to Alternative B except they would apply to priority and general habitat rather than only PPH. These include generally enhancing or maintaining/retaining sagebrush canopy cover and community structure; applying appropriate seasonal restrictions for implementing fuels treatments according to the type of sage-grouse seasonal habitats present; and requiring use of native seeds for fuels management treatment based on availability, adaptation (site potential), and probability of success. In addition, Alternative D would not allow fuels treatment projects to be implemented in priority and general habitat if it is determined the treatment would not be beneficial to GRSG or its habitat. It would identify opportunities for prescribed fire and require use of certified weed-free seeds. Alternative D would prioritize pre-suppression activities in sage-grouse habitats that are vulnerable to wildfire events and post-fire treatments in priority and general habitat to maximize benefits to greater sage-grouse. Overall, these conservation measures would reduce the threat of wildfire to sagebrush compared to Alternative A, although in general, the effects of fire suppression and fuels treatments would be similar to those of Alternative A. Prioritization of suppression and fuels treatments in priority and general habitat under Alternative D, rather than limiting them to PPH under Alternative B, would make Alternative D more protective of GRSG and GRSG habitat, in the long term, than Alternative B.

#### Cumulative Effects

The cumulative effect of management actions under Alternative D, when combined with the past, present and reasonably foreseeable future actions are similar to the cumulative effects described in Alternative B, and are not expected to be substantial, change the existing population trend, or remove and fragment sagebrush habitat past a critical threshold within Management Zones III, IV and V (refer to Chapter 5 of the DEIS).

#### Wild Horse and Burro Management – Direct and Indirect Effects

Under Alternative D, gathers would be prioritized in priority and general habitat as opposed to only PPH under Alternative B. Otherwise Alternative B is similar to management proposed in Alternative B in that wild horse and burro populations would be managed within established

AML to meet sage-grouse habitat objectives for all WHTs within or containing priority or general habitat. Unlike Alternative B, adjustments to AML through the NEPA process would be considered in WHTs not meeting standards due to degradation that can be at least partially contributed to wild horse or burro populations; adjustments would be based on monitoring data and would seek to protect and enhance priority and general habitat and establish a thriving ecological balance. Alternative D would be expected to reduce the impacts of wild horses and burros on GRSG described under Alternative A over a larger area than Alternative B.

#### Cumulative Effects

Portions of Management Zone III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories. Forest Service-administered lands within Management zones IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); see Chapter 5 of the DEIS]. Although livestock grazing occurs throughout all management zones, and has the potential to compound the effects of livestock grazing on these lands, in the DEIS it is only considered a “lesser threat” with respect to “relative cumulative actions” and only for Management Zone V (see Chapter 5 of the DEIS).

Under Alternative D, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), wild horse and burro Territories would be managed for Appropriate Management Level and livestock grazing would continue to be managed through existing grazing plans. However, additional emphasis on protecting existing sagebrush habitat under Alternative D would provide an added benefit to GRSG habitat. Therefore, the direct and indirect effects of livestock grazing and wild horse and burro management to Greater Sage-Grouse in Management Zones III, IV and V from the management actions under Alternative D, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions, would not substantially increase impacts on Greater Sage-Grouse.

#### Energy and Locatable Minerals Development – Direct and Indirect Effects

Under Alternative D, a NSO stipulation, with no allowance for waivers, exceptions, or modifications, would be applied to un-leased federal fluid mineral estate in priority sage-grouse habitat and a NSO stipulation, with allowance for waivers, exception, or modifications, would be applied in un-leased federal fluid mineral estate in general sage-grouse habitat. Geophysical exploration that does not result in crushing of sagebrush vegetation or create new or additional surface disturbance would be allowed within priority and general sage-grouse habitat, but geophysical operations would be subject to timing and controlled surface use limitations. Proposed surface disturbance in unleased priority habitat must achieve no net unmitigated loss of priority habitat; seasonal restrictions on exploratory drilling that prohibit surface-disturbing activities in winter habitat and during the lekking, nesting, and early brood-rearing season would be applied in all priority sage-grouse habitat. Required Design Features (RDFs) would be applied as Conditions of Approval within priority and general sage-grouse habitat on existing fluid mineral leases.

Similar to Alternative A, new plans of operation for authorized locatable minerals on forest service-administered lands would require the inclusion of measures to avoid or minimize adverse effects to GRSG populations or their habitat. Priority and general habitat would be closed to non-

energy leasable mineral leasing and prospecting. No new commercial mineral material sales would be allowed in priority and general habitat, but sales to meet Federal, Tribal, State, County and public needs would be allowed in general habitat; loss of habitat through disturbance in general habitat would be off-set through off-site mitigation. Alternative D would manage priority and general habitat as ROW exclusion areas for new large-scale wind and solar energy facilities (see *Land Uses and Realty Management*), whereas Alternative B would manage PPH as a new ROW exclusion area and PGH as a new ROW avoidance area.

Although the conservation measures proposed under Alternative D would overall reduce the general impacts on GRSG associated with energy and locatable minerals development discussed under Alternative A, Alternative D would be less protective of PPH than Alternative B with respect to new fluid mineral leasing, because Alternative B would close PPH to new fluid mineral leasing. On the other hand, it would be more protective of PGH than Alternative B with respect to new fluid mineral leasing, because Alternative B does not include specific management for new or existing fluid minerals leasing in general habitat. Alternative D would be similar to Alternative B with respect to existing fluid mineral leases by requiring application of design features in priority habitat. Under Alternative D, both priority and general habitat would be closed to non-energy leasable mineral leasing and prospecting as opposed to only PPH under Alternative B.

#### Cumulative Effects

Energy development is currently a minor threat present only in Management Zone III but geothermal energy development potential is high throughout Management Zone IV (refer to Chapter 5 of the DEIS). Mining is common across Management Zones III and IV in Nevada and occurs at a variety of scales. Under Alternative D, within Management Zones III IV and V, some of the current management direction associated with energy and locatable minerals development would continue, however, additional emphasis on protecting existing sagebrush would be included. Alternative D is the same as Alternative A with respect to areas closed to entry, but adds NSO restrictions to all PPH and PGH without waiver, exception, or modification. NSO restrictions would apply to PGH with allowance for waivers, exceptions and modifications. Management under Alternatives D would maintain current acreage open to mineral development but add the application of best management practices and off-site mitigation. Therefore, the direct and indirect effects of energy and locatable minerals development to Greater Sage-Grouse in Management Zones III, IV and V from the added management actions under Alternative D, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to Greater Sage-Grouse (refer to Chapter 5 of the DEIS).

#### Land Uses and Realty Management – Direct and Indirect Effects

Like Alternative B, Alternative D would contain provisions to retain public ownership of priority sage-grouse habitat and to acquire state and private lands with intact subsurface mineral estate where suitable conservation actions for GRSG could not otherwise be achieved, require co-location of new ROWs or SUAs associated with valid existing rights with existing development, and, where appropriate, bury new and existing utility lines as mitigation unless not feasible. Unlike Alternative B, Alternative D would manage priority and general habitat as ROW

exclusion areas for new large-scale commercial wind and solar energy facilities and ROW avoidance areas for all other ROWs or SUAs. Development within avoidance areas could occur if the development incorporates appropriate RDFs in design and construction (e.g. noise, tall structure, seasonal restrictions, etc.) and development results in no net un-mitigated loss of priority or general habitat. In addition, ROW holders in priority and general habitat would be required to retro-fit existing power lines and other utility structure with perch-detering devices during ROW renewal process. These conservation measures make this alternative more protective than Alternative A, although the general effects would be the same. It would be less protective than Alternatives B and C with respect to new siting of general ROWs and SUAs because priority habitat would be an avoidance area rather than an exclusion area. But it would be more protective with respect to large-scale commercial wind and solar energy facilities by excluding them in priority and general habitat altogether.

#### Cumulative Effects

Management actions associated with land uses and realty under Alternative D would increase protection of Greater Sage-Grouse habitat, thereby benefitting Greater Sage-Grouse rather than removing or fragmenting habitat. Under Alternative D, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), some of the current land and realty operations would continue, however, additional emphasis on protecting existing sagebrush habitat and preventing disturbance to GRSG would be included. Land uses and realty management activities would focus ROW exclusion or avoidance areas in Greater Sage-Grouse habitat. Therefore, the direct and indirect effects of lands and realty management to Greater Sage-Grouse in Management Zones III, IV and V under Alternative D, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions, would not substantially increase impacts to Greater Sage-Grouse.

#### Travel, Transportation and Recreation Management – Direct and Indirect Effects

Under current management, travel on most Forest Service-administered lands is limited to designated roads, although off road motorized big game retrieval within ½ mile of roads is authorized on the Mountain City, Ruby Mountains, and Jarbidge Ranger Districts of the Humboldt-Toiyabe National Forest, with some restrictions. Like Alternative B, Alternative D would limit motorized travel to designated routes, there would be limited opportunities for road construction with minimum standards applied and no upgrading of current roads, and only recreational SUAs that are neutral or beneficial to sage-grouse would be permitted. Unlike Alternative B, Alternative D would extend these measures beyond PPH to include PGH. In addition, under Alternative D no new recreation facilities (including, but not limited to, campgrounds, day use areas, scenic pullouts, trailheads, etc.) would be constructed in priority and general habitat. Although general impacts would be the same as Alternative A, Alternative D is more restrictive than Alternative A or Alternative B. It would likely reduce loss, fragmentation and disturbance to GRSG leks and nesting habitat by minimizing human use and road construction or upgrades and reducing automotive collisions with individual birds.

#### Cumulative Effects

Recreation is considered a “lesser threat” with respect to “relative cumulative actions” addressed in the DEIS and only for Management Zone V (see Chapter 5 of the DEIS). Management actions associated with travel, transportation and recreation under Alternative D would increase

protection of Greater Sage-Grouse habitat within PPH and PGH, thereby benefitting Greater Sage-Grouse rather than removing or fragmenting habitat. Under Alternative D, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), some of the current travel, transportation and recreation management direction would continue, however, additional emphasis on protecting existing sagebrush habitat would be included. Therefore, the direct and indirect effects of travel, transportation and recreation management to Greater Sage-Grouse in Management Zones III, IV and V under Alternative D, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions, would not substantially increase impacts to Greater Sage-Grouse.

## **Alternative E**

All management actions under Alternative E would correspond to areas identified on the Sage-Grouse Management Areas (SGMAs) Map contained in the “2012 Strategic Plan for the Conservation of Greater Sage-Grouse in Nevada” (2012 Plan) produced by Nevada stakeholders at the request of the governor. The SGMAs include four categories - Occupied Habitat, Suitable Habitat, Potential Habitat, and Non Habitat areas - as defined in the 2012 Plan. The Nevada Sagebrush Ecosystem Council would further refine the habitat categories within the SGMAs and determine where the best possible habitat exists based on recommendations from the Nevada Sagebrush Ecosystem Technical Team. All management Actions would be implemented through a coordinated effort among local, state and federal agencies, unless an agency is specifically noted. Alternative E would not provide fixed exclusion or avoidance areas, but would seek to achieve conservation through a goal of “no net loss” in the Occupied, Suitable and Potential Habitat categories for activities that could be controlled, such as a planned disturbance or development. Management under Alternative E would be subject to an avoid, minimize, and mitigate approach, which would provide a lower level of certainty than alternatives that have fixed exclusion and avoidance land allocations based on PPH and PGH designations.

### Vegetation and Soils – Direct and Indirect Effects

Under Alternative E, landscape-level treatments in Sage-Grouse Management Areas (SGMAs) would be initiated to reverse the effects of pinyon-juniper encroachment and restore healthy, resilient sagebrush ecosystems. Plans to remove Phase I and Phase II encroachment and treat Phase III encroachment would be aggressively implemented to reduce the threat of severe conflagration and restore SGMAs where possible, especially in areas in close proximity to Occupied and Suitable Habitat. Temporary roads to access treatment areas would be allowed and constructed with minimum design standards to avoid and minimize impacts and removed and restored upon completion of treatment. Under Alternative E, the State of Nevada would continue to incentivize and assist in the development of bio-fuels and other commercial uses of pinyon-juniper resources and increase the incentives for private industry investment in biomass removal, land restoration, and renewable energy development by authorizing stewardship contracts for up to 20 years. Alternative E would provide for an increase in conifer encroachment efforts for GRSG habitat compared to Alternative A and addresses it more specifically than Alternatives B or C.

Under Alternative E, invasive plants would be managed through a combination of surveys, biological control, educational activities, native planting and reseeded of previously treated sites

in areas susceptible to invasion, and weed-free gravel and forage certifications and inspections. SGMAs would be managed to prevent invasive species and to suppress and restore areas with existing infestations. Existing areas of invasive vegetative that pose a threat to SGMAs would be treated through the use of herbicides, fungicides or bacteria to control cheatgrass and medusahead infestations. All burned areas within SGMAs would be reviewed and evaluated in a timely manner to ascertain the reclamation potential for reestablishing Sage-Grouse habitat, enhancing ecosystem resiliency, and controlling invasive weed species.

#### Cumulative Effects

Under Alternative E, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), current vegetation and soils management treatments, including mechanical, manual, chemical, and biological control of invasive plants and pinyon and juniper, would continue and the short-term negative impacts of these activities on GRSG and GRSG habitats would continue to be outweighed by the long-term beneficial impacts including increased forage, cover quality and composition, reduced predator perches, decreased fire spread and intensity and potentially increased water availability. However, additional emphasis on protecting existing sagebrush habitat under Alternative E would provide an added benefit to GRSG habitat. Therefore, the direct and indirect effects of vegetation and soils management to Greater Sage-Grouse in Management Zones III, IV and V from the management actions under Alternative E, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to Greater Sage-Grouse.

#### Livestock Grazing – Direct and Indirect Effects

Alternative E would manage grazing permits to maintain or enhance SGMAs. It would utilize livestock grazing, when appropriate, as a management tool, to improve Sage-Grouse habitat quantity, quality or to reduce wildfire threats. Alternative E would expand the promotion of proper livestock grazing practices that promote the health of perennial grass communities in order to suppress the establishment of cheatgrass. Riparian areas would be managed to current agency standards. Within riparian areas, Alternative E would promote grazing within acceptable limits and development of additional infrastructure (e.g., fences and troughs) in order to facilitate this action. In comparison with Alternative A, management under Alternative E would provide less protection to GRSG and their habitats. There are fewer conservation measures associated with this alternative including no management actions associated with direct impacts on GRSG or lek or nesting habitat (refer to Alternative A). Riparian impacts would be expected to be greater due to more areas being available for livestock use and fewer overall GRSG specific habitat enhancement/maintenance actions would occur under this alternative.

#### Cumulative Effects

Although livestock grazing occurs throughout all management zones, in the DEIS it is only considered a “lesser threat” with respect to “relative cumulative actions” and only for Management Zone V (see Chapter 5 of the DEIS). In addition, portions of Management Zone III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories which have the potential to compound the effects of livestock grazing on these lands; Forest Service-administered lands within Management zones IV and V do not contain wild horse



and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); see Chapter 5 of the DEIS].

Under Alternative E, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), there would be fewer restrictions on livestock grazing than under Alternative A, including no management actions associated with direct impacts on GRSG or leks or nesting habitat. In addition, riparian impacts would be expected to be greater due to more areas being available for livestock use and fewer overall GRSG specific habitat enhancement/maintenance actions would occur. Wild horse and burro Territories would be managed for Appropriate Management Level as under current management. Under Alternative E, the direct and indirect effects of livestock grazing, in conjunction with the past, present and reasonably foreseeable future actions, could result in the increased loss and fragmentation of the existing sagebrush habitat in Management Zones III, IV and V (refer to Chapter 5 of the DEIS).

#### Fire and Fuels – Direct and Indirect Effects

Alternative E would utilize a unique approach to fire and fuels management. Under Alternative E, emphasis would be on sagebrush habitat protection and restoration within the State of Nevada Sage-Grouse Management Areas. With respect to hazardous fuels treatments, this alternative sets a goal of supporting incentives for developing a beneficial use for biomass. Wildland fires in SGMAs would be managed to reduce the number of wildfires that escape initial attack and become greater than 300 acres down to two to three percent of all wildfire ignitions over a ten year period. Additional emphasis under Alternative E integrates the prepositioning of suppression resources and preventative actions similar to Alternative D. Prepositioning and preventative actions would increase the likelihood of successful fire management actions with response to wildfire. Fuels reduction treatments would be similar to Alternative B, with added emphasis on coordination of state and local agencies and individual landowners.

#### Cumulative Effects

The cumulative effect of management actions under Alternative E, when combined with the past, present and reasonably foreseeable future actions are similar to the cumulative effects described in Alternative B, and are not expected to be substantial, change the existing population trend, or remove and fragment sagebrush habitat past a critical threshold within Management Zones III, IV and V (refer to Chapter 5 of the DEIS).

#### Wild Horse and Burro Management – Direct and Indirect Effects

Management under Alternative E would maintain wild horses at AML in WHTs to avoid and minimize impacts on Sage-Grouse Management Areas, evaluate conflicts with WHT designations in Sage-Grouse Management Areas, modify Land and Resource Management Plans to avoid negative impacts on GRSG and, if necessary, resolve conflicts between the Wild and Free Roaming Horse and Burro Act and the Endangered Species Act. Wild horse and burro management under Alternative E would be similar to Alternative A. Therefore, impacts to Greater Sage-Grouse are expected to be similar.

#### Cumulative Effects

Portions of Management Zone III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories. Forest Service-administered lands within

Management zones IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); see Chapter 5 of the DEIS]. Under Alternative E, wild horse and burro Territories would be managed for Appropriate Management Level as under current management. Therefore, the direct and indirect effects of wild horse and burro management to Greater Sage-Grouse in Management Zones III, IV and V from the management actions under Alternative E, which would be largely neutral for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions, would not substantially increase impacts to Greater Sage-Grouse.

#### Energy and Locatable Minerals Development – Direct and Indirect Effects

The Alternative E management strategy would be to avoid conflicts with GRSG habitat by siting new minerals and energy facilities and activities outside of habitat wherever possible. Projects that have an approved BLM notice, plan of operation, right-of-way, or drilling plan would be exempt from any new mitigation requirements above and beyond what has already been stipulated in the projects' approvals. Exploration projects would be designed for mineral access and the betterment of GRSG habitat. Roads and other ancillary features that impact GRSG habitat would be designed to avoid where feasible and otherwise minimize and mitigate impacts in the short and long term. New linear features would be sited in existing corridors or, at a minimum, co-located with existing linear features in SGMAs. Measures to deter raptor perching and raven nesting on elevated structures would be applied to energy development projects. Energy developers would be required to work closely with state and federal agency experts to determine important GRSG nesting, brood rearing and winter habitats and avoid those areas, and energy development or infrastructure features would be restricted within a 0.6 mile (1 km) radius around seeps, springs and wet meadows within identified brood rearing habitats wherever possible. As previously stated, Alternative E does not provide fixed exclusion or avoidance areas, leaving all management subject to an avoid, minimize, and mitigate approach, which provides a lower level of certainty than alternatives that have fixed exclusion and avoidance land allocations based on PPH and PGH designations. Under Alternative E, there would be the possibility for more land use for both energy and minerals development than under Alternative A, because construction of projects within or adjacent to GRSG habitat would not be ruled out, but the amount is not quantifiable. Therefore, the general impacts of energy and locatable minerals development on GRSG discussed under Alternative A would have the potential to increase under Alternative E.

#### Cumulative Effects

Energy development is currently a minor threat present only in Management Zone III but geothermal energy development potential is high throughout Management Zone IV (refer to Chapter 5 of the DEIS). Mining is common across Management Zones III and IV in Nevada and occurs at a variety of scales. Under Alternative E, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), there would be no fixed exclusion or avoidance areas, as under Alternatives B, C, D or F, leaving all management subject to an avoid, minimize, and mitigate approach, which provides a lower level of certainty than alternatives that have fixed exclusion and avoidance land allocations based on habitat designations. In addition, there would be the possibility for more land use for both energy and minerals development than under Alternative A, because construction of projects within or adjacent to GRSG habitat would not be ruled out. Therefore, under Alternative E, the direct and indirect effects of energy and locatable minerals

development, in conjunction with the past, present and reasonably foreseeable future actions, may result in the increased loss and fragmentation of the existing sagebrush habitat in Management Zones III, IV or V (refer to Chapter 5 of the DEIS).

#### Land Uses and Realty Management – Direct and Indirect Effects

Under Alternative E, no areas would be subject to exclusion or avoidance, but habitat disturbance, including habitat improvement projects, in Occupied and Suitable Habitat would be limited to not more than five percent per year, and in Potential Habitat to not more than twenty percent per year, per SGMA, unless habitat treatments show credible positive results. On federal lands in Nevada with pre-approved activities, no new mitigation would take place beyond previously approved in Plans of Development, right of ways, or drilling plans. General guidance would be to avoid when possible, minimize adverse effects as practicable, and mitigate adverse effects in Occupied or Suitable Habitat. Whenever possible, this alternative would locate facilities in non-habitat areas, site new linear features in existing corridors or co-locate them with other existing features and engage in reclamation and weed control efforts. This alternative provides fewer measures when compared to Alternatives A, B, C, D or F to reduce the general impacts of land uses and realty management described under Alternative A to GRSG and sagebrush habitats. Therefore, Alternative E would not be as protective of GRSG as any of the other alternatives.

#### Cumulative Effects

Management actions associated with land uses and realty under Alternative E would not include specific exclusion or avoidance areas but would limit total disturbance within Occupied and Suitable Habitats and implement an avoid, minimize, mitigate approach, as discussed above. This would provide a lower level of certainty for Greater Sage-Grouse habitat protection under Alternative E than under alternatives that have fixed exclusion and avoidance areas based on habitat designations and could lead to greater habitat fragmentation under Alternative E. Therefore, the direct and indirect effects land uses and realty management under Alternative E, in conjunction with the past, present and reasonably foreseeable future actions, may result in the increased loss and fragmentation of the existing sagebrush habitat in Management Zones III, IV or V (refer to Chapter 5 of the DEIS).

#### Travel, Transportation and Recreation Management – Direct and Indirect Effects

Under Alternative E, travel, transportation and recreation management would essentially remain the same as it currently is under Alternative A. Therefore, impacts to Greater Sage-Grouse under Alternative E are expected to be similar to those of Alternative A.

#### Cumulative Effects

Recreation is considered a “lesser threat” with respect to “relative cumulative actions” addressed in the DEIS and only for Management Zone V (see Chapter 5 of the DEIS). Current travel, transportation and recreation management as it exists under Alternative A would continue under Alternative E. The limitation of motorized travel to existing routes and permitting of recreational SUAs that are neutral or beneficial to sage-grouse, as well as limited opportunities for road construction and upgrading of current roads, would not be instituted as they would be in Alternatives B, C, D and F. Under Alternative E, the direct and indirect effects from travel,

transportation and recreation management, in conjunction with the past, present and reasonably foreseeable future actions, may result in the increased loss and fragmentation of the existing sagebrush habitat in Management Zones III, IV and V (refer to Chapter 5 of the DEIS).

## **Alternative F**

### Vegetation and Soils – Direct and Indirect Effects

Unlike Alternative B, Alternative F includes a conservation measure specifically directed at invasive plants that would develop and implement methods for prioritizing and restoring sagebrush steppe invaded by nonnative plants. Like Alternative B, Alternative F would manage pinyon-juniper encroachment under current direction (see Alternative A). In addition, GRSG vegetation management conservation measures would benefit weed and conifer control efforts by prioritizing restoration efforts, including reducing invasive plants, and monitoring and controlling invasive species after fuels treatments and at existing new range improvements in all occupied GRSG habitat (PPH and PGH as opposed to only PPH under Alternative B). Together, these measures would reduce impacts from invasive plants and pinyon-juniper encroachment on GRSG habitat, as described under Alternative A, more so than Alternative B although the effects of the treatments would be the same.

### Cumulative Effects

Under Alternative F, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), current vegetation and soils management treatments, including mechanical, manual, chemical, and biological control of invasive plants and pinyon and juniper, would continue and the short-term negative impacts of these activities on GRSG and GRSG habitats would continue to be outweighed by the long-term beneficial impacts including increased forage, cover quality and composition, reduced predator perches, decreased fire spread and intensity and potentially increased water availability. However, additional emphasis on protecting existing sagebrush habitat under Alternative F would provide an added benefit to GRSG habitat. Therefore, the direct and indirect effects of vegetation and soils management to Greater Sage-Grouse in Management Zones III, IV and V from the management actions under Alternative F, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to Greater Sage-Grouse.

### Livestock Grazing – Direct and Indirect Effects

Alternative F would include beneficial management actions similar to those of Alternative B except they would apply in all GRSG habitats. These include completion of Land Health Assessments, consideration of grazing methods and systems to reduce impacts on sage-grouse habitat, consideration of retiring vacant allotments, improved management of riparian areas and wet meadows, evaluation of existing introduced perennial grass seedings, authorization of new water developments and structural range improvements only when beneficial to GRSG, BMPs for West Nile Virus, and fence removal, modification or marking.. Together these efforts would reduce the impacts from grazing on GRSG described under Alternative A.

### Cumulative Effects

Although livestock grazing occurs throughout all management zones, in the DEIS it is only considered a “lesser threat” with respect to “relative cumulative actions” and only for Management Zone V (see Chapter 5 of the DEIS). In addition, portions of Management Zone III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories which have the potential to compound the effects of livestock grazing on these lands; Forest Service-administered lands within Management zones IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); see Chapter 5 of the DEIS].

Under Alternative F, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), livestock grazing would continue to be managed through existing grazing plans Wild horse and burro Territories would be managed for Appropriate Management Level. However, additional emphasis on protecting existing sagebrush habitat under Alternative F would provide an added benefit to GRSG habitat. Therefore, the direct and indirect effects of livestock grazing and wild horse and burro management to Greater Sage-Grouse in Management Zones III, IV and V from the management actions under Alternative F, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to Greater Sage-Grouse.

#### Fire and Fuels – Direct and Indirect Effects

Fire and fuels management under Alternative F would essentially be the same as that under Alternative B. Please refer to Alternative B. The impacts on GRSG would be the same.

#### Cumulative Effects

The cumulative of management actions under Alternative F, when combined with the past, present and reasonably foreseeable future actions are similar to the cumulative effects described in Alternative B, and are not expected to be substantial, change the existing population trend, or remove and fragment sagebrush habitat past a critical threshold within Management Zones III, IV and V (refer to Chapter 5 of the DEIS).

#### Wild Horse and Burro Management – Direct and Indirect Effects

Wild horse and burro management under Alternative F would be similar to that proposed under Alternative B except all conservation measures, but the measure prioritizing gathers in PPH, would extend to all occupied GRSG habitat. Therefore, the beneficial impacts on GRSG under Alternative F would be the same as those under Alternative B except they would apply to all occupied GRSG habitat making Alternative F more protective of GRSG and GRSG habitat than Alternative B.

#### Cumulative Effects

Refer to Alternative B. Cumulative effects would be the same.

#### Energy and Locatable Minerals Development – Direct and Indirect Effects

Energy and locatable minerals development is similar to proposed management under Alternative B. Under Alternative F siting of wind energy development would be prevented in PPH; PPH would be closed to new fluid mineral leasing, nonenergy leasable mineral leasing, and mineral material sales; it would be proposed for withdrawal from mineral entry; no new surface

occupancy (NSO) would be stipulated for leased fluid minerals and a 3% disturbance cap would be applied. Numerous conservation measures would be implemented to reduce impacts from mineral exploration and development activities in PPH. Like Alternative B, Alternative F does not include specific management for locatable, or saleable or nonenergy minerals in PGH. Unlike Alternative B, Alternative F directly addresses wind energy and fluid minerals development outside of PPH: wind energy would be sited at least five miles from active sage-grouse leks and at least four miles from the perimeter of sage-grouse winter habitat and areas within 4 miles of active sage-grouse leks would be closed to new fluid minerals leasing. Alternative F, although similar to Alternative B, would reduce the impacts of energy development on GRSG and GRSG habitat, as described under Alternative A, more so than Alternative B because it addresses siting of wind energy and fluid minerals leasing outside of PPH more thoroughly than alternative B.

#### Cumulative Effects

Energy development is currently a minor threat present only in Management Zone III but geothermal energy development potential is high throughout Management Zone IV (refer to Chapter 5 of the DEIS). Mining is common across Management Zones III and IV in Nevada and occurs at a variety of scales. Management actions associated with energy and locatable minerals development under Alternative B would increase protection of Greater Sage-Grouse habitat, primarily within PPH, thereby benefitting Greater Sage-Grouse rather than removing or fragmenting habitat. Under Alternatives B, within Management Zones III and IV, some of the current energy and locatable minerals management direction would continue, however, additional emphasis on protecting existing sagebrush habitat by adding all PPH to existing closures and proposing it for withdrawal would be included. Therefore, the direct and indirect effects of energy and locatable minerals development to Greater Sage-Grouse in Management Zones III, IV and V from the management actions under Alternative B, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to Greater Sage-Grouse.

#### Land Uses and Realty Management – Direct and Indirect Effects

Land uses and realty management under Alternative F would essentially be the same as that under Alternative B. Please refer to Alternative B. The effects would be the same.

#### Cumulative Effects

Management actions associated with land uses and realty under Alternative F would increase protection of Greater Sage-Grouse habitat, thereby benefitting Greater Sage-Grouse rather than removing or fragmenting habitat. Under Alternative F, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), some of the current land and realty operations would continue, however, additional emphasis on protecting existing sagebrush habitat and preventing disturbance to GRSG would be included. Lands and realty management activities would focus ROW exclusion or avoidance areas in Greater Sage-Grouse habitat. Therefore, the direct and indirect effects of lands and realty management to Greater Sage-Grouse in Management Zones III, IV and V under Alternative F, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to Greater Sage-Grouse.

### Travel, Transportation and Recreation Management – Direct and Indirect Effects

With respect to travel, transportation and recreation, Alternative F is similar to Alternative B: within PPH, only recreational SUAs that are neutral or beneficial to GRSG would be permitted, there would be limited opportunities for new route construction and upgrading of existing routes could only occur if they would not result in a new route category (road, primitive road, or trail) or capacity, unless it is necessary for motorist safety, or eliminates the need to construct a new road. In addition, Alternative F would expand the Alternative B measure restricting motorized travel to designated routes in PPH to include PGH, designated routes in sage-grouse priority habitat would be considered for closure, camping areas within 4 miles of active leks would seasonally be closed, permanent seasonal road or area closures to protect breeding, nesting and brood rearing sage-grouse would be implemented and new road construction would be prohibited within 4 miles of active sage-grouse leks. Although the general recreational effects of Alternative F would be the same as those for Alternatives A and B, Alternative F would be more protective of GRSG and GRSG habitat, particularly with respect to reducing disturbance to GRSG and protecting sagebrush habitat from degradation and introduction of invasive weeds, than Alternative B due to the additional measures.

#### Cumulative Effects

Recreation is considered a “lesser threat” with respect to “relative cumulative actions” addressed in the DEIS and only for Management Zone V (see Chapter 5 of the DEIS). Management actions associated with travel, transportation and recreation under Alternative F would increase protection of Greater Sage-Grouse habitat within PPH and, in some instances, PGH and PPH, thereby benefitting Greater Sage-Grouse rather than removing or fragmenting habitat. Under Alternative F, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), some of the current travel, transportation and recreation management direction would continue, however, additional emphasis on protecting existing sagebrush habitat would be included. Therefore, the direct and indirect effects of travel, transportation and recreation management to Greater Sage-Grouse in Management Zones III, IV and V under Alternative D, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions, would not substantially increase impacts to Greater Sage-Grouse.

### **B. Mule Deer (*Odocoileus hemionus*)**

#### **Life History**

Mule deer (including all subspecies) are distributed throughout western North America from southern Alaska, south to Baja Mexico, east to central Canada and the Plains states. The species is a widespread resident of Nevada, with habitats ranging from low-elevation shrublands to upper elevation subalpine communities. Mule deer in Nevada generally summer at higher elevations and migrate to lower woodlands or shrublands in winter to find food and seek cover from winter weather.

Mule deer occur in a diversity of habitat types throughout Nevada but occur in highest densities in montane shrub dominated communities [Nevada Department of Wildlife (NDOW) 2012].

Cover habitat is utilized to ameliorate thermal conditions, as well as provide security.

Vegetation providing cover may include basin big sagebrush, pinyon-juniper, aspen, and conifer stands. Dietary composition consists of a mix of grasses, grass-like plants (i.e. sedges and

rushes), forbs, shrubs, and trees. Species selection and ratio of relative use varies locally, regionally, and seasonally. Shrubs and trees (browse) dominate deer diets during the winter. During the spring, consumption of forbs, grasses, and grass-like species increases. As grasses cure, forbs and browse become the species utilized as summer forage, and in the fall use of shrubs and trees increase and again are the predominate forage. Lands on the Humboldt National Forest provide the full complement of seasonal habitats and encompass a considerable portion of mule deer range in Nevada (Figure 3).

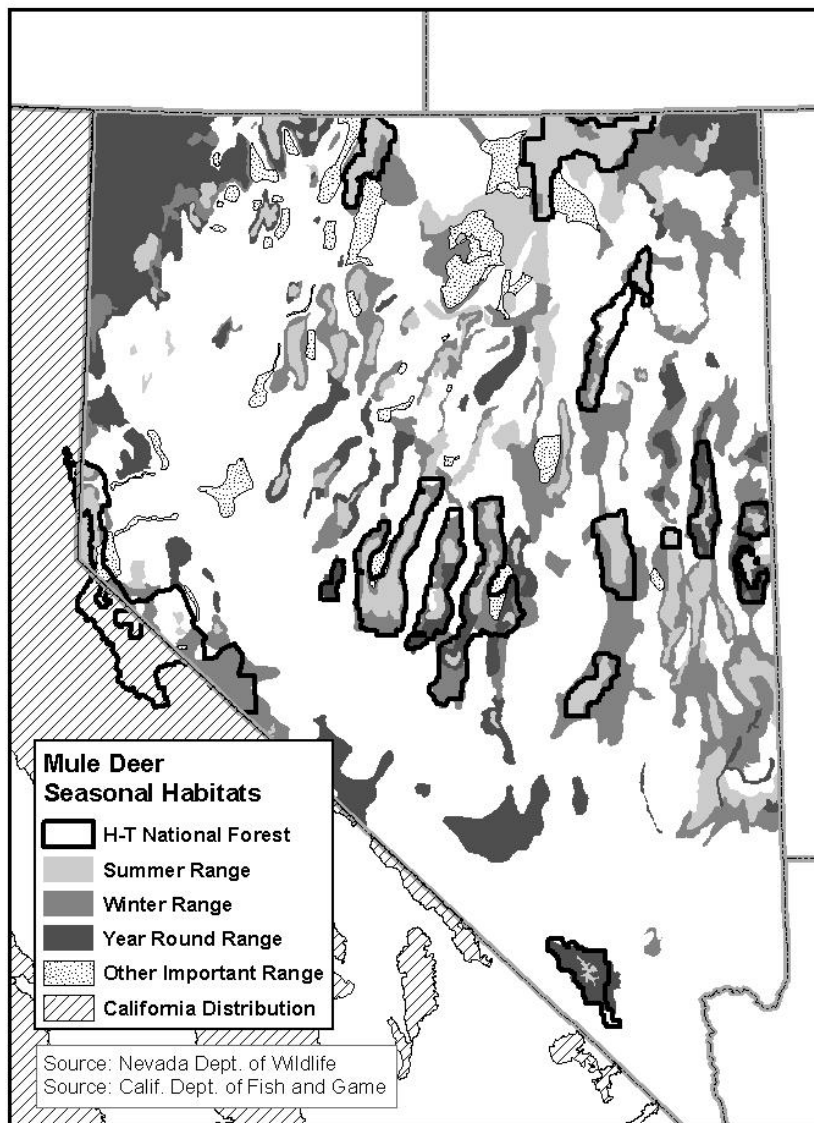


Figure 3. Mule deer habitat distribution in Nevada



Habitat loss and degradation are the primary concerns for this species: invasive weeds, increase in number and frequency of large-scale fires, pinyon-juniper encroachment, shrubland decadence, urban development and expansion, and drought all contribute to habitat degradation and loss (NDOW 2012). Decreases in quality of summer range and loss of critical wintering habitat in particular has been the biggest challenges to the species (NDOW 2012).

### **Statewide Population, Status, Abundance and Trend**

Mule deer are monitored through annual aerial surveys (NDOW) and managed under the Mule Deer Species Policy Plan (NDOW) (NDOW 2012). Populations have been stable near the long-term average since 2002 and remain significantly higher than historic levels. The mule deer is ranked as secure (at very low risk of extirpation, extinction, or elimination due to a very extensive range, abundant populations or occurrences, and little to no concern from declines or threats), both globally (G5) and in the State of Nevada (S5) (NatureServe 2010). Mule deer populations in Nevada have undergone dramatic highs and lows over the past 150 years. Today's numbers are estimated to be higher than historic populations. Statewide mule deer numbers have remained relatively stable over the past 10 years (Figure 4).

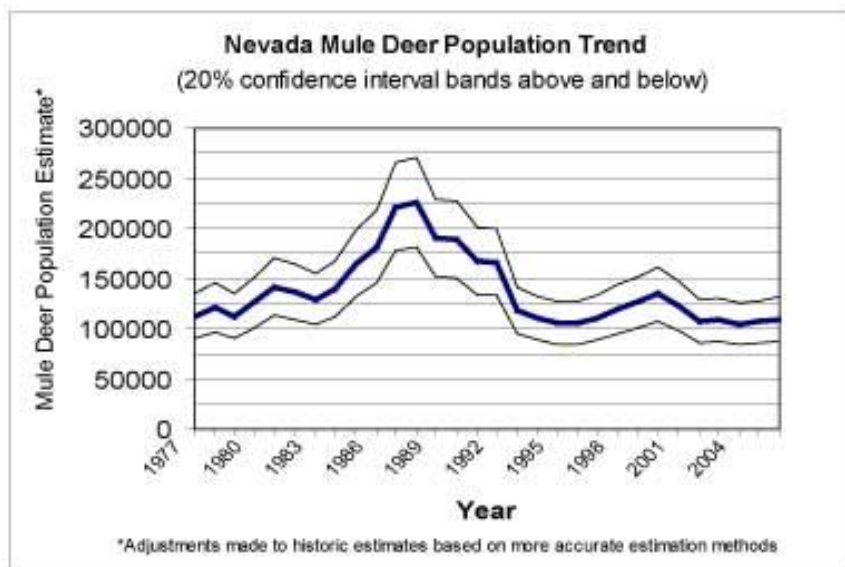


Figure 4. Approximate mule deer population trends in Nevada (source: NDOW 2006)

### **Forest MIS Monitoring**

The 1986 Humboldt NF LRMP identified the mule deer as the MIS representing all vegetative types, and the current (1986) population of mule deer at 63,000 animals, with a maximum potential of 88,200 animals (July 1990 Amendment #2). The 1986 Toiyabe NF LRMP identified the mule deer as the MIS to evaluate Forest activities on deer habitat, with a population objective of 33.6 thousand deer by decade 3 (2001-2010) and maintained through 2030. Mule deer habitat has been carefully reviewed by the Humboldt-Toiyabe National Forest and is included in the Forest MIS Reports (Humboldt National Forest 2008 and Toiyabe National Forest 2008).

## Alternative A - No Action

### Vegetation and Soils – Direct and Indirect Effects

As previously discussed for GRSG, invasive species such as cheatgrass or native species such as pinyon or juniper have replaced desirable dominant species in parts of the sub-region. Invasive plants are thought to alter plant community structure and composition, productivity, nutrient cycling, and hydrology, and may competitively exclude native plant populations. Cheatgrass competes with native grasses and forbs in sagebrush habitat. Invasive species cause direct degradation of sagebrush habitats including cover quality and composition, increased wildfire frequency and intensity (see *Fire and Fuels* discussion below) and are a particular threat to mule deer habitat. As discussed below in *Fire and Fuels*, the encroachment of pinyon and juniper from higher elevations into sagebrush habitats can have a negative impact on sagebrush habitat. Expansion of conifer woodlands threatens mule deer habitat, because they do not provide suitable habitat and trees displace shrubs, grasses and forbs.

To reduce the likelihood of invasive weed spread and the extent of current infestations, integrated weed management techniques, including mechanical, manual, chemical, and biological control are utilized. Implementation of these techniques would improve vegetation management by decreasing invasive species, provide for native vegetation establishment in sagebrush habitat, reduce the risk of wildfire, and restore fire-adapted ecosystems and repair lands damaged by fire. Mechanical juniper and pinyon pine treatments would result in short-term disturbances of soils and sagebrush due to heavy equipment, skid trails and temporary roads and could reduce the amount of available cover although the amount would be expected to be small relative to the overall amount of available cover. Mechanical and manual treatments would also increase noise, vehicular traffic and human presence. However, once the site potential is restored there would be an increase in forage, cover quality and composition benefitting mule deer. In addition, there would be a decrease in fire spread and intensity and a potential increase in water availability.

### Cumulative Effects

Temporal and spatial boundaries used in the cumulative effects analysis for mule deer are the same as those for Greater Sage-Grouse. The baseline date for the cumulative impacts analysis is 2012. The temporal scope of this analysis is a 20-year planning horizon; land management planning documents are generally evaluated on a 5-year cycle. The temporal boundary for cumulative effects analysis includes Western Association of Fish and Wildlife Agencies (WAFWA) Management Zones III (Southern Great Basin), IV (Snake River Plain), and V (Northern Great Basin) (Figure 2), which is large enough to encompass large-ranging species such as mule deer.

Under Alternative A, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), current vegetation and soils management treatments, including mechanical, manual, chemical, and biological control of invasive plants and pinyon and juniper, would continue and the short-term negative impacts of these activities on mule deer and sagebrush habitats would generally continue to be outweighed by the long-term beneficial impacts. Therefore, the direct and indirect effects of vegetation and soils management to mule deer in Management Zones III, IV and V

from the management actions under Alternative A, which would be largely beneficial for mule deer, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to mule deer or sagebrush habitat.

#### Livestock Grazing – Direct and Indirect Effects

Depending upon site-specific management, beneficial or adverse impacts of grazing on mule deer or sagebrush habitat would continue. Grazing practices can benefit habitat and mule deer by reducing fuel load, protecting intact sagebrush habitat and increasing habitat extent and continuity. However, grazing at inappropriate intensity, season, or location may alter or degrade sagebrush ecosystems or meadow/wetland/spring/stream habitat. In addition, grazing can negatively impact mule deer through competition for forage or disturbance or temporary displacement, particularly during movement or trailing operations. Depending on the type, structural range improvements such as fences can present potential movement barriers.

Under Alternative A, livestock grazing would continue to be managed through existing grazing plans, with methods and guidelines from the existing plans followed to maintain ecological conditions according to Standards for Rangeland Health, which include maintaining healthy, productive and diverse populations of native plants and animals. Riparian habitats would be managed to achieve standards. Range improvements would be designed to meet both wildlife and range objectives, and would include building or modifying fences to permit passage of wildlife and reduce the chance of bird strikes, use of off-site water facilities, and in some cases modification or removal or improvements not meeting resource needs. Modifications may involve moving troughs, adding or changing wildlife escape ramps, or ensuring water is available on the ground for a various different wildlife species. Although not directly created to protect mule deer, these approaches would protect and enhance mule deer habitat by reducing the likelihood of the types of impacts described above.

#### Cumulative Effects

Although livestock grazing occurs throughout all management zones, in the DEIS it is only considered a “lesser threat” with respect to “relative cumulative actions” and only for Management Zone V (see Chapter 5 of the DEIS). In addition, portions of Management Zone III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories which have the potential to compound the effects of livestock grazing on these lands; Forest Service-administered lands within Management zones IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); see Chapter 5 of the DEIS].

Under Alternative A, within Management Zones III, IV and V, livestock grazing would continue to be managed through existing grazing plans, with methods and guidelines from the existing plans followed to maintain ecological conditions according to Standards for Rangeland Health, which include maintaining healthy, productive and diverse populations of native plants and animals. Wild horses and burro Territories would be managed for Appropriate Management Level (refer to *Wild Horse and Burro Management* section below) and healthy populations of wild horse and burros to achieve a thriving natural ecological balance with respect to wildlife, livestock use, and other multiple uses. Therefore, the direct and indirect effects of livestock grazing and wild horse and burro management to mule deer in Management Zones III, IV and V

from the management actions under Alternative A, which would be largely neutral for mule deer, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to mule deer or sagebrush habitat.

#### Fire and Fuels – Direct and Indirect Effects

Fire is particularly problematic in sagebrush systems because it kills sagebrush plants and, in some cases, re-burns before sagebrush has a chance to re-establish. Without fire, cheatgrass dominance can exclude sagebrush seedlings from establishing. With fire, areas can be converted to annual grasslands. Another factor affecting fire in some sagebrush sites is the encroachment of pinyon and juniper trees from higher elevations into sagebrush habitats. Under suitable conditions, wildfires that start in pinyon and juniper stands can move into Wyoming big sagebrush stands. In the absence of cheatgrass, Wyoming sagebrush sites can take 150 years to recover. Where cheatgrass is present, fire can open the site to invasion of annual grasses described above. The cheatgrass fire cycle causes sagebrush habitat loss and degradation on an annual basis. Currently, due to the extent of the threat, there are no management actions that can effectively alter this trend. Facilitation of the spread of cheatgrass and the likelihood of ignition through BLM and Forest Service-authorized programs is further discussed in the *Lands and Realty Management, Energy and Locatable Minerals Development and Travel, Transportation and Recreation* sections.

Alternative A would continue to manage fire suppression and fuels management under current direction. Policies would not prioritize protection or restoration of mature sagebrush habitat. Under Alternative A, wildfires would likely continue to increase in size and frequency in sagebrush habitat and that habitat would subsequently continue to be degraded or lost. Sagebrush habitat could be removed or degraded because of the use of heavy equipment or hand tools. Disturbance from equipment associated with suppression could negatively impact behaviors and/or changes in mule deer movement patterns could occur due to areas devoid of vegetation. In addition, suppression may initially result in higher rates of juniper encroachment in some areas, eliminating forage for mule deer while increasing cover. Over time, conifer encroachment could culminate in heavy fuel loadings that can contribute to larger-scale wildfire events that eliminate forage in adjacent areas.

#### Cumulative Effects

Current wildfire suppression operations and fuels management activities would continue under Alternative A. The limitation or prohibition of the use of prescribed fire in sagebrush habitats, as well as, the sagebrush protection emphasis during wildland fire operations would not be instituted as they would be in Alternatives B, C, D, E and F. Under Alternative A, the direct and indirect effects, in conjunction with the past, present and reasonably foreseeable future actions and the likelihood of increasing future fires from annual weed invasions and predicted climate change, may result in the increased loss and fragmentation of the existing sagebrush habitat from wildfire in Management Zones III, IV and V.

#### Wild Horse and Burro Management – Direct and Indirect Effects

Please refer to the Alternative A effects of *Wild Horse and Burro Management* for Greater Sage-Grouse. The general effects to mule deer would be similar except that, in addition, wild horses and burros could compete with large ungulates, such as mule deer, for water at spring sources..

### Cumulative Effects

Portions of Management Zone III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories; Forest Service-administered lands within Management zones IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); see Chapter 5 of the DEIS]. Although livestock grazing occurs throughout all management zones, and has the potential to compound the effects of wild horse and burro management on these lands, in the DEIS it is only considered a “lesser threat” with respect to “relative cumulative actions” and only for Management Zone V (see Chapter 5 of the DEIS).

Under Alternative A, within Management Zone III, wild horse and burro Territories would be managed for Appropriate Management Level (refer to Wild Horse and Burro Management section below) and healthy populations of wild horse and burros to achieve a thriving natural ecological balance with respect to wildlife, livestock use, and other multiple uses. Within Management Zones III, IV and V, livestock grazing would continue to be managed through existing grazing plans, with methods and guidelines from the existing plans followed to maintain ecological conditions according to Standards for Rangeland Health, which include maintaining healthy, productive and diverse populations of native plants and animals. Therefore, the direct and indirect effects of wild horse and burro management and livestock grazing to mule deer in Management Zones III, IV and V from the management actions under Alternative A, which would be largely neutral for mule deer, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to mule deer or sagebrush habitat.

### Energy and Locatable Minerals Development – Direct and Indirect Effects

Under Alternative A, all energy and locatable minerals development and associated infrastructure, including power lines, roads, buildings, fences, wind turbines, solar panels, and others, would continue to be managed under current direction. As such, this alternative would be expected to cause the greatest amount of direct and indirect impacts on mule deer and their habitat including loss, degradation, and fragmentation of habitat by roads, pipelines and power lines, disturbance of foraging or other critical behaviors, or displacement from increased levels of noise, presence of roads/humans and anthropogenic structures in an otherwise open landscape.

### Cumulative Effects

Energy development is currently a minor threat present only in Management Zone III but geothermal energy development potential is high throughout Management Zone IV (refer to Chapter 5 of the DEIS). Mining is common across Management Zones III and IV in Nevada and occurs at a variety of scales. Management under Alternative A would maintain the current acreage open to leasing of fluid minerals, without stipulations, and locatable mineral development, although areas closed to these activities under Alternative A include some existing ACEC designations, designated wilderness, and wilderness study areas. Current energy and minerals development activities would continue under Alternative A. The closure of areas to fluid minerals and other energy development and withdrawal of areas from mineral entry would not be instituted as they would be in Alternatives B, C, D and F. Therefore, under Alternative A, the direct and indirect effects of energy and locatable minerals development, in conjunction with the past, present and reasonably foreseeable future actions, may result in the increased loss and

fragmentation of the existing sagebrush habitat from energy and locatable minerals development in Management Zones III, IV or V (refer to Chapter 5 of the DEIS).

#### Land Uses and Realty Management – Direct and Indirect Effects

Under Alternative A, land tenure adjustments would be subject to current disposal/exchange/acquisition criteria, which include retaining lands with threatened or endangered species, high quality riparian habitat, or plant and animal populations or natural communities of high interest. This would reduce the likelihood of habitat conversion to agriculture, urbanization, or other uses that would remove sagebrush habitat. Existing Land and Resource Management Plan direction would apply under Alternative A. There would be no changes to the current National Forest System infrastructure including power lines, wind turbines, communications towers, fences, or roads. Permitted ROWs would continue to allow construction, maintenance, and operation activities that could result in habitat loss, fragmentation, or degradation of sagebrush winter range habitat or result in barriers to migration corridors. Construction and maintenance of infrastructure would continue to lead to higher short-term concentrations of human noise and disturbance that could cause disruption of foraging, or other behaviors, or temporary displacement of individuals. These activities could also lead to new infestations of noxious or invasive weeds and an increase in edge habitat. Though most projects would be forced to mitigate or minimize impacts, this alternative would likely have the greatest impact on sagebrush habitat used by mule deer and seasonal migration routes. Vehicles traveling on associated roads would continue to pose a collision hazard to mule deer. Though most projects would be forced to mitigate or minimize impacts, this alternative would likely have the greatest impact on mule deer and their habitat.

#### Cumulative Effects

Current lands and realty (i.e., infrastructure) management activities would continue under Alternative A. ROW exclusion or avoidance areas would not be instituted as they would be in Alternatives B, C, D, or F. Therefore, under Alternative A, the direct and indirect effects of lands and realty management, in conjunction with the past, present and reasonably foreseeable future actions, may result in the increased loss and fragmentation of the existing sagebrush habitat and disturbance to mule deer in Management Zones III, IV and V (refer to Chapter 5 of the DEIS).

#### Travel, Transportation and Recreation Management – Direct and Indirect Effects

Under current management, travel on most Forest Service-administered lands is limited to designated roads, although off road motorized big game retrieval within ½ mile of roads is authorized on the Mountain City, Ruby Mountains, and Jarbidge Ranger Districts of the Humboldt-Toiyabe National Forest, with some restrictions.

Under Alternative A, there would be no changes to the current National Forest System Roads, transportation plan, or recreation management on these forests. There would be minimal seasonal restrictions on casual use and some of the areas within GRSG habitat would remain open to cross country travel. In general, the more acres and miles of routes that are designated in an area, the greater the likelihood of disturbance of wildlife and fragmentation of habitat. In addition, less restrictive travel conditions usually mean higher concentrations of human use adjacent to motorized routes. This can cause disruption or temporary displacement of mule deer. Impacts from roads may include habitat loss from road construction, noise disturbance from vehicles, and

direct mortality from collisions with vehicles. Roads may also present barriers to migration corridors or seasonal habitats. This alternative has the highest potential to impact mule deer due to the lack of restrictions on activities that cause these effects. Therefore all direct and indirect effects on the species and its habitat would likely cause current trends to continue.

#### Cumulative Effects

Recreation is considered a “lesser threat” with respect to “relative cumulative actions” addressed in the DEIS and only for Management Zone V (see Chapter 5 of the DEIS). Current travel, transportation and recreation management would continue under Alternative A. The limitation of motorized travel to existing routes and permitting of recreational SUAs that are neutral or beneficial to sage-grouse and other sagebrush-associated species such as mule deer, as well as limited opportunities for road construction and upgrading of current roads, would not be instituted as they would be in Alternatives B, C, D and F. Under Alternative A, the direct and indirect effects from travel, transportation and recreation management, in conjunction with the past, present and reasonably foreseeable future actions, may result in the increased loss and fragmentation of the existing sagebrush habitat in Management Zones III, IV and V (refer to Chapter 5 of the DEIS).

### **Alternative B**

#### Vegetation and Soils – Direct and Indirect Effects

Under Alternative B, weed control efforts and pinyon-juniper encroachment would continue to be managed under current direction (see Alternative A). However, vegetation management conservation measures would benefit weed control efforts by prioritizing restoration efforts, including reducing invasive plants and, in turn, benefit mule deer habitat. BLM and Forest Service would require the use of native seeds and would design post-restoration management to ensure the long-term persistence of the restoration efforts, and would consider changes in climate when determining species for restoration. Invasive species would also be monitored and controlled after fuels treatments and at existing range improvements. Alternative B incorporates fewer invasive plant management measures in PGH compared to PPH. However, many of the same habitat restoration and vegetation management actions would be applied, including prioritizing the use of native seeds. Together, these measures would reduce impacts to mule deer from invasive plants described under Alternative A although the effects of the treatments would be the same.

#### Cumulative Effects

Under Alternative B, within Management Zones III, IV and V, current vegetation and soils management treatments, including mechanical, manual, chemical, and biological control of invasive plants and pinyon and juniper, would continue and the short-term negative impacts of these activities on mule deer and sagebrush habitats would continue to be outweighed by the long-term beneficial impacts including increased forage, cover quality and composition, decreased fire spread and intensity and, potentially, increased water availability. However, additional emphasis on protecting existing sagebrush habitat, under Alternative B would provide an added benefit to sagebrush habitat. Therefore, the direct and indirect effects of vegetation and soils management to mule deer in Management Zones III, IV and V from the management actions under Alternative B, which would be largely beneficial for mule deer, when combined

with the past, present and reasonably foreseeable future actions would not substantially increase impacts to mule deer or sagebrush habitat.

#### Livestock Grazing – Direct and Indirect Effects

Alternative B would implement a number of beneficial management actions in PPH to incorporate sage-grouse habitat objectives and management considerations into livestock grazing management. These include completion of Land Health Assessments, consideration of grazing methods and systems to reduce impacts on sagebrush habitat, consideration of retiring vacant allotments, improved management of riparian areas and wet meadows, evaluation of existing introduced perennial grass seedings, authorization of new water developments and structural range improvements only when beneficial to GRS, and fence removal, modification or marking. Several management actions to reduce impacts from livestock grazing on sage-grouse general habitat would be incorporated, including the potential to modify grazing systems to meet seasonal sage-grouse habitat requirements and management to improve the conditions of riparian areas and wet meadows, which would benefit mule deer. Together these efforts would reduce the negative grazing-related impacts on mule deer described under Alternative A.

#### Cumulative Effects

Although livestock grazing occurs throughout all management zones, in the DEIS it is only considered a “lesser threat” with respect to “relative cumulative actions” and only for Management Zone V (see Chapter 5 of the DEIS). In addition, portions of Management Zone III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories which have the potential to compound the effects of livestock grazing on these lands. Forest Service-administered lands within Management zones IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); see Chapter 5 of the DEIS].

Under Alternative B, within Management Zones III, IV and V, livestock grazing would continue to be managed through existing grazing plans and wild horse and burro Territories would be managed for Appropriate Management Level. However, additional emphasis on protecting existing sagebrush habitat under Alternative B would provide an added benefit to sagebrush habitat. Therefore, the direct and indirect effects of livestock grazing and wild horse and burro management to mule deer in Management Zones III, IV and V from the management actions under Alternatives B, which would be largely beneficial for mule deer, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to mule deer or their habitat.

#### Fire and Fuels – Direct and Indirect Effects

Under Alternative B, suppression would be prioritized in PPH to protect mature sagebrush habitat. Suppression would be prioritized in PGH only where fires threaten PPH. Suppression-related juniper encroachment discussed under Alternative A could increase in some areas under Alternative B, eliminating sagebrush habitat and eventually resulting in heavy fuel loadings that could contribute to larger-scale wildfire events.

Alternative B does not include any other specific management for wildland fire management in PGH. Fuels treatments would be designed to protect sagebrush ecosystems by maintaining



sagebrush cover, implementing fuel breaks, applying seasonal restrictions, protections for winter range, and requiring use of native seeds. Post-fuels treatments would be designed to ensure long-term persistence of seeded areas and native plants and maintain 15 percent canopy cover. Fuels treatments would also monitor and control for invasive species, and fuels management BMPs would incorporate invasive plant prevention measures. Invasive species monitoring and control measures would benefit mule deer by reducing or eliminating competition of invasive species with forage species. Overall, these conservation measures would reduce the threat of wildfire to sagebrush compared to Alternative A although the general effects of fire suppression and fuels treatments on mule deer would be similar to those of Alternative A.

#### Cumulative Effects

Management actions under Alternative B, with respect to fire and fuels, would increase protection of sagebrush habitat, thereby benefitting mule deer rather than removing or fragmenting habitat. Under Alternative B, within Management Zones III, IV and V, current wildfire suppression operations would continue, however, additional emphasis on protecting existing sagebrush habitat during suppression activities and pre-suppression planning and staging for maximum protection of Greater Sage-Grouse habitat would be included. Fuels treatment activities would focus on protecting Greater Sage-Grouse habitat, primarily within PPH. Therefore, the direct and indirect effects of fire to mule deer in Management Zones III, IV and V from the management actions under Alternative B, which would be largely beneficial for mule deer, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to mule deer or their habitat.

#### Wild Horse and Burro Management – Direct and Indirect Effects

Under Alternative B, wild horses and burros would be managed at AML on the same number of acres as Alternative A, with gathers prioritized based on PPH habitat and emergency environmental issues. Wild Horse Territory (WHT) Plans would incorporate GRSG habitat objectives in PPH. Land health assessments to determine existing structure/condition/composition of vegetation within all Territories would be conducted. Implementation of any range improvements in PPH would follow the same guidance as identified for livestock grazing in this alternative including designing and locating new improvements only where they “conserve, enhance, or restore GRSG habitat through improved grazing management”. Design features could include treating invasive species associated with range improvements. Additional range improvements in PPH would specifically address the needs of GRSG. In comparison to Alternative A, Alternative B would prioritize GRSG habitat objectives in WHT Plans and base AML numbers on GRSG habitat needs which would also likely benefit sagebrush-associated species, such as mule deer, by reducing the types of wild horse and burro management-related impacts discussed under Alternative A.

#### Cumulative Effects

Portions of Management Zone III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories. Forest Service-administered lands within Management zones IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); see Chapter 5 of the DEIS]. Although livestock grazing occurs throughout all management zones, and has the potential to compound the effects of livestock grazing on these lands, in the

DEIS it is only considered a “lesser threat” with respect to “relative cumulative actions” and only for Management Zone V (see Chapter 5 of the DEIS).

Under Alternative B, within Management Zones III, IV and V, wild horse and burro Territories would continue to be managed for Appropriate Management Level and livestock grazing would continue to be managed through existing grazing plans. However, additional emphasis on protecting existing sagebrush habitat under Alternative B would provide an added benefit to mule deer. Therefore, the direct and indirect effects of livestock grazing and wild horse and burro management to mule deer in Management Zones III, IV or V from the management actions under Alternative B, which would be largely beneficial for mule deer, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to mule deer or their habitat.

#### Energy and Locatable Minerals Development – Direct and Indirect Effects

Under this Alternative, PPH would be closed to new fluid mineral leasing, nonenergy leasable mineral leasing, and mineral material sales, and it would be proposed for withdrawal from mineral entry. In addition, mandatory BMPs would be applied as conditions of approval on fluid mineral leases. No surface occupancy (NSO) would be stipulated for leased fluid minerals within PPH. A 3% disturbance cap to activities in PPH would be applied and numerous conservation measures would be implemented to reduce impacts from mineral exploration and development activities in PPH. These measures would reduce the impacts of energy development described under Alternative A on mule deer within PPH.

Alternative B does not include specific management for fluid, saleable, locatable, and nonenergy leasable minerals in PGH or wind energy or solar energy development in PPH or PGH. As a result, current trends would continue and impacts would be similar to those under Alternative A. Although Alternative B does not directly address wind energy development or industrial solar development, its 3% threshold for anthropogenic disturbances (See *Land Uses and Realty Management*) would apply to energy development and would limit the extent of all types of energy development in PPH. These measures would reduce the impacts of energy development on mule deer described under Alternative A.

#### Cumulative Effects

Energy development is currently a minor threat present only in Management Zone III but geothermal energy development potential is high throughout Management Zone IV (refer to Chapter 5 of the DEIS). Mining is common across Management Zones III and IV in Nevada and occurs at a variety of scales. Management actions associated with energy and locatable minerals development under Alternative B would increase protection of sagebrush habitat, primarily within PPH, thereby benefitting mule deer rather than removing or fragmenting habitat. Under Alternative B, within Management Zones III and IV, some of the current energy and locatable minerals management direction would continue, however, additional emphasis on protecting existing sagebrush habitat by adding all PPH to existing closures and proposing it for withdrawal would be included. Therefore, the direct and indirect effects of to mule deer in Management Zones III, IV and V from the management actions associated with energy and locatable minerals development under Alternative B, which would be largely beneficial for mule deer, when

combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to mule deer.

#### Land Uses and Realty Management – Direct and Indirect Effects

Under this alternative, all PPH would be managed as exclusion areas and PGH would be managed as an avoidance area for new ROW and SUA projects and co-location of new ROWs or SUAs with existing infrastructure would occur in PPH and PGH. It would also include the following within PPH: co-location of new ROWs or SUAs with existing infrastructure; removal, burying, or modification of existing power lines; co-location of new facilities with existing facilities, where possible; use of existing roads, or realignments to access valid existing rights that are not yet developed or constructing new roads to the absolute minimum standard necessary if valid existing rights could not be accessed via existing roads; and a 3% threshold on anthropogenic disturbance (including, but not limited to, highways, roads, geothermal wells, wind turbines, and associated facilities) within PPH.

In addition, Alternative B would contain provisions to retain public ownership of priority sage-grouse habitat and to acquire state and private lands with intact subsurface mineral estate where suitable conservation actions for GRSG could not otherwise be achieved. This alternative would benefit mule deer by maximizing connectivity and minimizing loss, fragmentation, degradation and disturbance of sagebrush habitats within PPH by power lines, communication towers and roads. Mule deer and sagebrush habitat outside PPH would likely experience little change in direct or indirect effects. However, if the 3% development threshold ended up concentrating new infrastructure development outside PPH rather than just reducing it within PPH, the extent of impacts on mule deer and sagebrush habitat outside PPH could increase under Alternative B relative to Alternative A. Alternative B would reduce the likelihood of collisions addressed in Alternative A. These conservation measures make this alternative more protective of mule deer than Alternative A, although the general effects would be the same.

#### Cumulative Effects

Management actions associated with lands and realty under Alternatives B would increase protection of sagebrush habitat, thereby benefitting mule deer rather than removing or fragmenting habitat. Under Alternative B, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), some of the current land and realty operations would continue, however, additional emphasis on protecting existing sagebrush habitat and preventing disturbance to GRSG would be included. Lands and realty management activities would focus ROW exclusion or avoidance areas in Greater Sage-Grouse habitat. Therefore, the direct and indirect effects of lands and realty management to mule deer in Management Zones III, IV and V under Alternative B, which would be largely beneficial for mule deer, when combined with the past, present and reasonably foreseeable future actions, would not substantially increase impacts to mule deer.

#### Travel, Transportation and Recreation Management – Direct and Indirect Effects

Under Alternative B, motorized travel in PPH would be limited to designated roads, primitive roads, and trails. Only recreational SUAs that are neutral or beneficial to sage-grouse would be permitted in PPH and there would be limited opportunities for road construction in PPH, with minimum standards applied and no upgrading of current roads. Although general impacts would be the same as Alternative A, Alternative B is more restrictive than Alternative A and it would

likely reduce loss and fragmentation of mule deer habitat and disturbance to mule deer in PPH by minimizing human use and road construction or upgrades, and reduce the potential for automotive collisions with individual mule deer within PPH. However, if these measures ended up concentrating recreational use and additional roads outside PPH rather than just reducing it within PPH, the extent of impacts on mule deer outside PPH could increase under Alternative B relative to Alternative A.

#### Cumulative Effects

Recreation is considered a “lesser threat” with respect to “relative cumulative actions” addressed in the DEIS and only for Management Zone V (see Chapter 5 of the DEIS). Management actions associated with travel, transportation and recreation under Alternative B would increase protection of sagebrush habitat, thereby benefitting mule deer rather than removing or fragmenting habitat. Under Alternative B, within Management Zones III, IV and V, some of the current travel, transportation and recreation management direction would continue, however, additional emphasis on protecting existing sagebrush habitat would be included. Therefore, the direct and indirect effects of travel, transportation and recreation management to mule deer in Management Zones III, IV and V under Alternative B, which would be largely beneficial for mule deer, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to mule deer.

### **Alternative C**

#### Vegetation and Soils – Direct and Indirect Effects

Alternative C would maintain the direction described under Alternative A for weed control and pinyon-juniper encroachment and include additional provisions that would limit invasive weed spread in all occupied GRSG habitat. Vegetation management would benefit weed control efforts, by prioritizing restoration, including reducing invasive plants, in order to benefit sage-grouse habitats. In all cases, local native plant ecotype seeds and seedlings would be used. These policies would reduce the impacts of invasive plants on mule deer described under Alternative A and have similar impacts associated with treatment, but would include additional conservation measures specific to limiting the spread of invasive plants. In addition, grazing would be eliminated within all occupied sage-grouse habitat, eliminating the potential for invasive plant spread by livestock. This would generally make Alternative C more protective of mule deer and mule deer habitat than Alternatives A or B.

#### Cumulative Effects

Under Alternative C, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), current vegetation and soils management treatments, including mechanical, manual, chemical, and biological control of invasive plants and pinyon and juniper, would continue and the short-term negative impacts of these activities on mule deer and sagebrush habitat would continue to be outweighed by the long-term beneficial impacts including increased forage, cover quality and composition, decreased fire spread and intensity and potentially increased water availability. However, additional emphasis on protecting existing sagebrush habitat under Alternative C would provide an added benefit to sagebrush habitat. Therefore, the direct and indirect effects of vegetation and soils management to mule deer in Management Zones III, IV and V from the management actions under Alternative C, which would be largely beneficial for mule deer, when

combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to mule deer or their habitat.

#### Livestock Grazing – Direct and Indirect Effects

Under Alternative C, grazing would be eliminated within all occupied sage-grouse habitat reducing both the negative and positive grazing-related impacts on mule deer and sagebrush habitat discussed under Alternative A more so than any of the other alternatives. No new water developments or range improvements would be constructed in occupied habitat and only habitat treatments that benefit GRSG would be allowed; most GRSG habitat treatments would be expected to benefit mule deer habitat as well. Retirement of grazing would be allowed and fast tracked. Once grazing is eliminated, Alternative C could negatively impact mule deer by eliminating artificial water developments in higher-elevation allotments overlapping mule deer summer habitat that individuals have come to rely upon, but it could improve riparian conditions.

#### Cumulative Effects

Although livestock grazing occurs throughout all management zones, in the DEIS it is only considered a “lesser threat” with respect to “relative cumulative actions” and only for Management Zone V (see Chapter 5 of the DEIS). Under Alternative C, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), livestock grazing would be eliminated within all occupied GRSG habitat, providing a net benefit to sagebrush habitat. Therefore, the direct and indirect effects of livestock grazing to mule deer in Management Zones III, IV and V from management under Alternative C, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to mule deer or sagebrush habitat.

#### Fire and Fuels – Direct and Indirect Effects

Alternative C is similar to Alternative B except that it is more protective of mule deer habitat because prioritization of suppression would apply to All Occupied Habitat, it includes measures to manage vegetation for good or better ecological condition, and it focuses fuel breaks on areas of human habitation or significant disturbance. Some of the negative impacts of fire suppression on conifer encroachment and fire suppression and fuels treatments on mule deer discussed under Alternative A would be offset by the prioritization of restoration treatments described below for invasive plants. The general effects of fire suppression and fuels treatments would be similar to those of Alternative A.

#### Cumulative Effects

The cumulative effect of management actions related to fire and fuels under Alternative C, when combined with the past, present and reasonably foreseeable future actions are similar to the cumulative effects described in Alternative B, and are not expected to be substantial or remove or fragment sagebrush habitat past a critical threshold within Management Zones III, IV and V (refer to Chapter 5 of the DEIS).

#### Wild Horse and Burro Management – Direct and Indirect Effects

Under Alternative C, wild horses and burros would be managed at AML. However, AML establishment would be analyzed in conjunction with livestock numbers during grazing permit renewals. Combined with the removal of some fences during “active restoration” processes related to livestock grazing, horses and burros would be expected to range over a larger area than

in Alternative A and would necessitate the need for increased gather schedules. The increase in access to riparian and upland habitats that are currently protected by fences, and expected temporary increases in horses and burros over AML, could reduce food and cover for mule deer, degrade riparian habitat or increase the potential for competition between wild horses and burros and large ungulates at spring sources.

#### Cumulative Effects

Portions of Management Zone III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories. Forest Service-administered lands within Management zones IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); see Chapter 5 of the DEIS]. Under Alternative C, wild horse and burro Territories would be managed for AML as under current management, however, there would be fewer restrictions on wild horse and burro movement than under Alternative A. Therefore, the direct and indirect effects of wild horse and burro management under Alternative C, in conjunction with the past, present and reasonably foreseeable future actions, may result in the increased loss and fragmentation of the existing sagebrush habitat in Management Zones III, IV and V (refer to Chapter 5 of the DEIS).

#### Energy and Locatable Minerals Development – Direct and Indirect Effects

Alternative C would expand several of the protections under Alternative B to all occupied habitat as well as prohibit new exploration permits for unleased fluid minerals (also see *Land Uses and Realty Management* below). Like Alternative B, the conservation measures proposed under Alternative C would reduce the impacts of energy and locatable minerals development on mule deer described under Alternative A, but to a larger degree than any of the other alternatives.

#### Cumulative Effects

Energy development is currently a minor threat present only in Management Zone III but geothermal energy development potential is high throughout Management Zone IV (refer to Chapter 5 of the DEIS). Mining is common across Management Zones III and IV in Nevada and occurs at a variety of scales. Management actions under Alternative C with regard to energy and locatable minerals development would increase protection of all occupied habitat, thereby benefitting mule deer. Under Alternative C, within Management Zones III and IV, some of the current energy and locatable minerals management direction would continue, however, additional emphasis on protecting existing sagebrush habitat by adding all occupied habitat to existing closures and proposing it for withdrawal would be included. Therefore, the direct and indirect effects of fire to mule deer in Zones III, IV and V from the management actions under Alternative C, which would be largely beneficial for mule deer, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to mule deer or sagebrush habitat.

#### Land Uses and Realty Management – Direct and Indirect Effects

Alternative C would have the most protective GRSG conservation measures with respect to mule deer and infrastructure. Alternative C would extend many of the Alternative B conservation measures to all occupied habitat and all occupied habitat would be managed as an exclusion area for new ROW projects. As a result, management under Alternative C would encourage

consolidation of sage-grouse habitats, facilitating habitat conservation and management and reduce the impacts of infrastructure on mule deer described under Alternatives A and B in a wider area than Alternative B. Unlike Alternative B, which would permit wind energy siting in PPH provided a development disturbance threshold of 3% were not exceeded, Alternative C would not permit wind energy development siting in all occupied GRSG habitat. This would reduce the effects of wind energy on mule deer discussed under Alternative A more so than Alternative B. Like alternative B, Alternative C would aim to remove, bury, or modify existing power lines but would apply to all occupied GRSG habitat, having the potential to disturb more mule deer and sagebrush habitat during implementation and maintenance. This measure would protect larger areas of sagebrush habitat from degradation, fragmentation and has the potential to prevent or reduce disturbance to or displacement of mule deer over a larger area.

#### Cumulative Effects

Management actions associated with lands and realty under Alternative C would increase protection of Greater Sage-Grouse habitat, thereby benefitting mule deer rather than removing or fragmenting habitat. Under Alternative C, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), some of the current land and realty operations would continue, however, additional emphasis on protecting existing sagebrush habitat and preventing disturbance to GRSG would be included. Lands and realty management activities would focus ROW exclusion or avoidance areas in Greater Sage-Grouse habitat. Therefore, the direct and indirect effects of lands and realty management to mule deer in Management Zones III, IV and V under Alternative C, which would be largely beneficial for mule deer, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to mule deer or sagebrush habitat.

#### Travel, Transportation and Recreation Management – Direct and Indirect Effects

Alternative C is similar to Alternative B except that it would apply to all occupied habitat and, therefore, protect a larger area of sagebrush habitat than Alternative B from the same types of general recreational impacts described in Alternative A.

#### Cumulative Effects

Recreation is considered a “lesser threat” with respect to “relative cumulative actions” addressed in the DEIS and only for Management Zone V (see Chapter 5 of the DEIS). Management actions associated with travel, transportation and recreation under Alternative C would increase protection of all occupied Greater Sage-Grouse habitat, thereby benefitting mule deer rather than removing or fragmenting habitat. Under Alternative C, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), some of the current travel, transportation and recreation management direction would continue, however, additional emphasis on protecting existing sagebrush habitat would be included. Therefore, the direct and indirect effects of travel, transportation and recreation management to mule deer in Management Zones III, IV and V under Alternative C, which would be largely beneficial for mule deer, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to mule deer or sagebrush habitat.

## **Alternative D**

### Vegetation and Soils – Direct and Indirect Effects

Alternative D would treat sites within priority and general sage-grouse habitat that are dominated by invasive species through an IVM approach using fire, chemical, mechanical and biological methods based on site potential. Targeted grazing would be allowed to suppress cheatgrass or other vegetation that are hindering achieving sage-grouse objectives in priority and general habitat. Sheep, cattle, or goats may be used as long as the animals are intensely managed and removed when the utilization of desirable species reaches 35%. In perennial grass, invasive annual grass, and conifer-invaded cover types, sagebrush steppe would be restored with sagebrush seedlings where feasible.

Pinyon and juniper treatment in encroached sagebrush vegetation communities in priority habitat and general habitat would focus on enhancing, reestablishing, or maintaining habitat components (e.g. cover, security, food, etc.) in order to achieve habitat objectives. Phase II and III pinyon and/or juniper stands would be removed or reduced in biomass to meet fuel and sage-grouse habitat objectives and appropriate action would be taken to establish desired understory species composition, including seeding and invasive species treatments. Treatment methods that maintain sagebrush and shrub cover and composition would be used in areas with a sagebrush component. More so than Alternatives A, B or C, Alternative D has the potential to benefit mule deer habitat from more targeted pinyon and juniper removal. Possible short-term disturbance-related impacts to mule deer from treatments would be the same under Alternative D as under Alternative A as would the general long-term benefits.

### Cumulative Effects

Under Alternative D, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), current vegetation and soils management treatments, including mechanical, manual, chemical, and biological control of invasive plants and pinyon and juniper, would continue and the short-term negative impacts of these activities on mule deer and sagebrush habitats would continue to be outweighed by the long-term beneficial impacts including increased forage, cover quality and composition, decreased fire spread and intensity and potentially increased water availability. However, additional emphasis on protecting existing sagebrush habitat under Alternative D would provide an added benefit to sagebrush habitat. Therefore, the direct and indirect effects of vegetation and soils management to mule deer in Management Zones III, IV and V from the management actions under Alternative D, which would be largely beneficial for mule deer, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to mule deer or sagebrush habitat.

### Livestock Grazing – Direct and Indirect Effects

Alternative D, similar to Alternative B, would implement a number of beneficial management actions to incorporate sage-grouse habitat objectives and management considerations into livestock grazing management: consideration of grazing methods and systems to reduce impacts on sage-grouse habitat, consideration of retiring vacant allotments, improved management of riparian areas and wet meadows, evaluation of existing introduced perennial grass seedings, authorization of new water developments and structural range improvements only when beneficial to GRSG, the potential to modify grazing systems to meet seasonal sage-grouse



habitat requirements and fence removal, modification or marking. The main difference is that Alternative D would apply these conservation measures to priority and general habitat rather than limiting them to PPH as Alternative B would and Alternative D would not require the completion of Land Health Assessments to determine if standards of range-land health are being met as Alternative B would. These measures would reduce potential for negative impacts from grazing on mule deer described under Alternative A probably more so than Alternative B but less so than Alternative C that would eliminate livestock grazing in all occupied habitat.

#### Cumulative Effects

Although livestock grazing occurs throughout all management zones, in the DEIS it is only considered a “lesser threat” with respect to “relative cumulative actions” and only for Management Zone V (see Chapter 5 of the DEIS). In addition, portions of Management Zone III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories which have the potential to compound the effects of livestock grazing on these lands; Forest Service-administered lands within Management zones IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); see Chapter 5 of the DEIS].

Under Alternative D, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), livestock grazing would continue to be managed through existing grazing plans and wild horse and burro Territories would be managed for Appropriate Management Level. However, additional emphasis on protecting existing sagebrush habitat under Alternative D would provide an added benefit to sagebrush habitat. Therefore, the direct and indirect effects of livestock grazing and wild horse and burro management to mule deer in Management Zones III, IV and V from the management actions under Alternative D, which would be largely beneficial for mule deer, when combined with the past, present and reasonably foreseeable future actions, would not substantially increase impacts to mule deer or sagebrush habitat.

#### Fire and Fuels – Direct and Indirect Effects

Unlike Alternative B, in which suppression would be prioritized in PPH, but only in PGH where fires threaten PPH, Alternative D would prioritize suppression in priority and general sage-grouse habitat. In priority and general habitat, fuels treatments emphasizing maintaining, protecting, and expanding GRS habitat would be designed and implemented and would include measures similar to Alternative B except they would apply to priority and general habitat rather than only PPH. These include generally enhancing or maintaining/retaining sagebrush canopy cover and community structure; applying appropriate seasonal restrictions for implementing fuels treatments according to the type of sage-grouse seasonal habitats present; and requiring use of native seeds for fuels management treatment based on availability, adaptation (site potential), and probability of success. In addition, Alternative D would not allow fuels treatment projects to be implemented in priority and general habitat if it is determined the treatment would not be beneficial to GRS or its habitat. It would identify opportunities for prescribed fire and require use of certified weed-free seeds. Alternative D would prioritize pre-suppression activities in sage-grouse habitats that are vulnerable to wildfire events and post-fire treatments in priority and general habitat to maximize benefits to greater sage-grouse. Overall, these conservation measures would reduce the threat of wildfire to sagebrush compared to Alternative A, although in general, the effects of fire suppression and fuels treatments on mule deer and sagebrush habitat

would be similar to those of Alternative A. Prioritization of suppression and fuels treatments in priority and general habitat under Alternative D, rather than limiting them to PPH under Alternative B, would make Alternative D more protective of mule deer and sagebrush habitat, in the long term, than Alternative B.

#### Cumulative Effects

The cumulative effect of management actions under Alternative D, when combined with the past, present and reasonably foreseeable future actions are similar to the cumulative effects described in Alternative B, and are not expected to be substantial or remove or fragment sagebrush habitat past a critical threshold within Management Zones III, IV and V (refer to Chapter 5 of the DEIS).

#### Wild Horse and Burro Management – Direct and Indirect Effects

Under Alternative D, gathers would be prioritized in priority and general habitat as opposed to only PPH under Alternative B. Otherwise Alternative B is similar to management proposed in Alternative B in that wild horse and burro populations would be managed within established AML to meet sage-grouse habitat objectives for all WHTs within or containing priority or general habitat. Unlike Alternative B, adjustments to AML through the NEPA process would be considered in WHTs not meeting standards due to degradation that can be at least partially contributed to wild horse or burro populations; adjustments would be based on monitoring data and would seek to protect and enhance priority and general habitat and establish a thriving ecological balance. Alternative D would be expected to reduce the impacts of wild horses and burros on mule deer described under Alternative A over a larger area than Alternative B.

#### Cumulative Effects

Portions of Management Zone III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories. Forest Service-administered lands within Management zones IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); see Chapter 5 of the DEIS]. Although livestock grazing occurs throughout all management zones, and has the potential to compound the effects of livestock grazing on these lands, in the DEIS it is only considered a “lesser threat” with respect to “relative cumulative actions” and only for Management Zone V (see Chapter 5 of the DEIS).

Under Alternative D, within Management Zones III, IV and V, wild horse and burro Territories would be managed for Appropriate Management Level and livestock grazing would continue to be managed through existing grazing plans. However, additional emphasis on protecting existing sagebrush habitat under Alternative D would provide an added benefit to sagebrush habitat. Therefore, the direct and indirect effects of livestock grazing and wild horse and burro management to mule deer in Management Zones III, IV and V from the management actions under Alternative D, which would be largely beneficial mule deer, when combined with the past, present and reasonably foreseeable future actions, would not substantially increase impacts on mule deer or their habitat.

#### Energy and Locatable Minerals Development – Direct and Indirect Effects

Under Alternative D, a NSO stipulation, with no allowance for waivers, exceptions, or modifications, would be applied to un-leased federal fluid mineral estate in priority sage-grouse

habitat and a NSO stipulation, with allowance for waivers, exception, or modifications, would be applied in un-leased federal fluid mineral estate in general sage-grouse habitat. Geophysical exploration that does not result in crushing of sagebrush vegetation or create new or additional surface disturbance would be allowed within priority and general sage-grouse habitat, but geophysical operations would be subject to timing and controlled surface use limitations. Proposed surface disturbance in unleased priority habitat must achieve no net unmitigated loss of priority habitat; seasonal restrictions on exploratory drilling that prohibit surface-disturbing activities in winter habitat and during the lekking, nesting, and early brood-rearing season would be applied in all priority sage-grouse habitat. Required Design Features (RDFs) would be applied as Conditions of Approval within priority and general sage-grouse habitat on existing fluid mineral leases.

Similar to Alternative A, new plans of operation for authorized locatable minerals on forest service-administered lands would require the inclusion of measures to avoid or minimize adverse effects to GRSG populations or their habitat. Priority and general habitat would be closed to non-energy leasable mineral leasing and prospecting. No new commercial mineral material sales would be allowed in priority and general habitat, but sales to meet Federal, Tribal, State, County and public needs would be allowed in general habitat; loss of habitat through disturbance in general habitat would be off-set through off-site mitigation. Alternative D would manage priority and general habitat as ROW exclusion areas for new large-scale wind and solar energy facilities (see *Land Uses and Realty Management*), whereas Alternative B would manage PPH as a new ROW exclusion area and PGH as a new ROW avoidance area.

Although the conservation measures proposed under Alternative D would overall reduce the general impacts on mule deer associated with energy and locatable minerals development discussed under Alternative A, Alternative D would be less protective of mule deer habitat within PPH than Alternative B with respect to new fluid mineral leasing, because Alternative B would close PPH to new fluid mineral leasing. On the other hand, it would be more protective of mule deer habitat within PGH than Alternative B with respect to new fluid mineral leasing, because Alternative B does not include specific management for new or existing fluid minerals leasing in general habitat. Alternative D would be similar to Alternative B with respect to existing fluid mineral leases by requiring application of design features in priority habitat. Under Alternative D, both priority and general habitat would be closed to non-energy leasable mineral leasing and prospecting as opposed to only PPH under Alternative B.

#### Cumulative Effects

Energy development is currently a minor threat present only in Management Zone III but geothermal energy development potential is high throughout Management Zone IV (refer to Chapter 5 of the DEIS). Mining is common across Management Zones III and IV in Nevada and occurs at a variety of scales. Under Alternative D, within Management Zones III IV and V, some of the current management direction associated with energy and locatable minerals development would continue, however, additional emphasis on protecting existing sagebrush would be included. Alternative D is the same as Alternative A with respect to areas closed to entry, but adds NSO restrictions to all PPH and PGH without waiver, exception, or modification. NSO restrictions would apply to PGH with allowance for waivers, exceptions and modifications. Management under Alternatives D would maintain current acreage open to mineral development

but add the application of best management practices and off-site mitigation. Therefore, the direct and indirect effects of energy and locatable minerals development to mule deer in Management Zones III, IV and V from the added management actions under Alternative D, which would be largely beneficial for mule deer, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to mule deer or sagebrush habitat (refer to Chapter 5 of the DEIS).

#### Land Uses and Realty Management – Direct and Indirect Effects

Like Alternative B, Alternative D would contain provisions to retain public ownership of priority sage-grouse habitat and to acquire state and private lands with intact subsurface mineral estate where suitable conservation actions for GRSG could not otherwise be achieved, require co-location of new ROWs or SUAs associated with valid existing rights with existing development and, where appropriate, bury new and existing utility lines as mitigation unless not feasible. Unlike Alternative B, Alternative D would manage priority and general habitat as ROW exclusion areas for new large-scale commercial wind and solar energy facilities and ROW avoidance areas for all other ROWs or SUAs. Development within avoidance areas could occur if the development incorporates appropriate RDFs in design and construction (e.g. noise, tall structure, seasonal restrictions, etc.) and development results in no net un-mitigated loss of priority or general habitat. In addition, ROW holders in priority and general habitat would be required to retro-fit existing power lines and other utility structure with perch-detering devices during ROW renewal process. These conservation measures make this alternative more protective of mule deer and sagebrush habitat than Alternative A, although the general effects would be the same. It would be less protective than Alternatives B and C with respect to new siting of general ROWs and SUAs because priority habitat would be an avoidance area rather than an exclusion area. But it would be more protective of mule deer and sagebrush habitat with respect to large-scale commercial wind and solar energy facilities by excluding them in priority and general habitat altogether.

#### Cumulative Effects

Management actions associated with land uses and realty under Alternative D would increase protection of sagebrush habitat, thereby benefitting mule deer rather than removing or fragmenting habitat. Under Alternative D, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), some of the current land and realty operations would continue, however, additional emphasis on protecting existing sagebrush habitat and preventing disturbance to GRSG would be included. Land uses and realty management activities would focus ROW exclusion or avoidance areas in Greater Sage-Grouse habitat. Therefore, the direct and indirect effects of lands and realty management to mule deer in Zones III, IV and V under Alternative D, which would be largely beneficial for mule deer, when combined with the past, present and reasonably foreseeable future actions, would not substantially increase impacts to mule deer.

#### Travel, Transportation and Recreation Management – Direct and Indirect Effects

Under current management, travel on most Forest Service-administered lands is limited to designated roads, although off road motorized big game retrieval within ½ mile of roads is authorized on the Mountain City, Ruby Mountains, and Jarbidge Ranger Districts of the Humboldt-Toiyabe National Forest, with some restrictions. Like Alternative B, Alternative D

would limit motorized travel to designated routes, there would be limited opportunities for road construction with minimum standards applied and no upgrading of current roads, and only recreational SUAs that are neutral or beneficial to sage-grouse would be permitted. Unlike Alternative B, Alternative D would extend these measures beyond PPH to include PGH. In addition, under Alternative D no new recreation facilities (including, but not limited to, campgrounds, day use areas, scenic pullouts, trailheads, etc.) would be constructed in priority and general habitat. Although general impacts would be the same as Alternative A, Alternative D is more restrictive than Alternative A or Alternative B. It would likely reduce habitat loss or fragmentation and disturbance to mule deer by minimizing human use and road construction or upgrades and reduce automotive collisions with individual mule deer.

#### Cumulative Effects

Recreation is considered a “lesser threat” with respect to “relative cumulative actions” addressed in the DEIS and only for Management Zone V (see Chapter 5 of the DEIS). Management actions associated with travel, transportation and recreation under Alternative D would increase protection of sagebrush habitat within PPH and PGH, thereby benefitting mule deer rather than removing or fragmenting habitat. Under Alternative D, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), some of the current travel, transportation and recreation management direction would continue, however, additional emphasis on protecting existing sagebrush habitat would be included. Therefore, the direct and indirect effects of travel, transportation and recreation management to mule deer in Management Zones III, IV and V under Alternative D, which would be largely beneficial for mule deer, when combined with the past, present and reasonably foreseeable future actions, would not substantially increase impacts to mule deer.

#### **Alternative E**

All management actions under Alternative E would correspond to areas identified on the Sage-Grouse Management Areas (SGMAs) Map contained in the “2012 Strategic Plan for the Conservation of Greater Sage-Grouse in Nevada” (2012 Plan) produced by Nevada stakeholders at the request of the governor. The SGMAs include four categories - Occupied Habitat, Suitable Habitat, Potential Habitat, and Non Habitat areas - as defined in the 2012 Plan. The Nevada Sagebrush Ecosystem Council would further refine the habitat categories within the SGMAs and determine where the best possible habitat exists based on recommendations from the Nevada Sagebrush Ecosystem Technical Team. All management Actions would be implemented through a coordinated effort among local, state and federal agencies, unless an agency is specifically noted. Alternative E would not provide fixed exclusion or avoidance areas, but would seek to achieve conservation through a goal of “no net loss” in the Occupied, Suitable and Potential Habitat categories for activities that could be controlled, such as a planned disturbance or development. Management under Alternative E would be subject to an avoid, minimize, and mitigate approach, which would provide a lower level of certainty than alternatives that have fixed exclusion and avoidance land allocations based on PPH and PGH designations.

#### Vegetation and Soils – Direct and Indirect Effects

Under Alternative E, landscape-level treatments in Sage-Grouse Management Areas (SGMAs) would be initiated to reverse the effects of pinyon-juniper encroachment and restore healthy,

resilient sagebrush ecosystems. Plans to remove Phase I and Phase II encroachment and treat Phase III encroachment would be aggressively implemented to reduce the threat of severe conflagration and restore SGMAs where possible, especially in areas in close proximity to Occupied and Suitable Habitat. Temporary roads to access treatment areas would be allowed and constructed with minimum design standards to avoid and minimize impacts and removed and restored upon completion of treatment. Under Alternative E, the State of Nevada would continue to incentivize and assist in the development of bio-fuels and other commercial uses of pinyon-juniper resources and increase the incentives for private industry investment in biomass removal, land restoration, and renewable energy development by authorizing stewardship contracts for up to 20 years. Alternative E would provide for an increase in conifer encroachment management for sagebrush habitat compared to Alternative A, B or C.

Under Alternative E, invasive plants would be managed through a combination of surveys, biological control, educational activities, native planting and reseedling of previously treated sites in areas susceptible to invasion, and weed-free gravel and forage certifications and inspections. SGMAs would be managed to prevent invasive species and to suppress and restore areas with existing infestations. Existing areas of invasive vegetative that pose a threat to SGMAs would be treated through the use of herbicides, fungicides or bacteria to control cheatgrass and medusahead infestations. All burned areas within SGMAs would be reviewed and evaluated in a timely manner to ascertain the reclamation potential for reestablishing Sage-Grouse habitat, enhancing ecosystem resiliency, and controlling invasive weed species. The effects under Alternative E would be similar to those under Alternative D although temporary road construction could increase disturbance effects to mule deer.

#### Cumulative Effects

Under Alternative E, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), current vegetation and soils management treatments, including mechanical, manual, chemical, and biological control of invasive plants and pinyon and juniper, would continue and the short-term negative impacts of these activities on mule deer and sagebrush habitats would continue to be outweighed by the long-term beneficial impacts including increased forage, cover quality and composition, decreased fire spread and intensity and potentially increased water availability. However, additional emphasis on protecting existing sagebrush habitat under Alternative E would provide an added benefit to sagebrush habitat. Therefore, the direct and indirect effects of vegetation and soils management to mule deer in Management Zones III, IV and V from the management actions under Alternative E, which would be largely beneficial for mule deer, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to mule deer or sagebrush habitat.

#### Livestock Grazing – Direct and Indirect Effects

Alternative E would manage grazing permits to maintain or enhance SGMAs. It would utilize livestock grazing, when appropriate, as a management tool, to improve Sage-Grouse habitat quantity, quality or to reduce wildfire threats which could benefit mule deer as well. Alternative E would expand the promotion of proper livestock grazing practices that promote the health of perennial grass communities in order to suppress the establishment of cheatgrass. Riparian areas would be managed to current agency standards. Within riparian areas, Alternative E would promote grazing within acceptable limits and development of additional infrastructure (e.g.,

fences and troughs) in order to facilitate this action. In comparison with Alternative A, management under Alternative E would probably provide less protection to mule deer and sagebrush habitat. In general, fewer overall sagebrush-specific habitat enhancement or maintenance actions would occur under this alternative and impacts to riparian structure would be expected to be greater due to more areas being available for livestock use.

#### Cumulative Effects

Although livestock grazing occurs throughout all management zones, in the DEIS it is only considered a “lesser threat” with respect to “relative cumulative actions” and only for Management Zone V (see Chapter 5 of the DEIS). In addition, portions of Management Zone III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories which have the potential to compound the effects of livestock grazing on these lands; Forest Service-administered lands within Management zones IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); see Chapter 5 of the DEIS].

Under Alternative E, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), there would be fewer restrictions on livestock grazing than under Alternative A. In addition, riparian impacts would be expected to be greater due to more areas being available for livestock use and fewer overall GRSG specific habitat enhancement/maintenance actions would occur. Wild horse and burro Territories would be managed for Appropriate Management Level as under current management. Under Alternative E, the direct and indirect effects of livestock grazing, in conjunction with the past, present and reasonably foreseeable future actions, could result in the increased loss and fragmentation of the existing sagebrush habitat in Management Zones III, IV and V (refer to Chapter 5 of the DEIS).

#### Fire and Fuels – Direct and Indirect Effects

Alternative E would utilize a very different approach to fire and fuels management. Under Alternative E, emphasis would be on sagebrush habitat protection and restoration within the SGMAs. With respect to hazardous fuels treatments, this alternative sets a goal of supporting incentives for developing a beneficial use for biomass. Wildland fires in SGMAs would be managed to reduce the number of wildfires that escape initial attack and become greater than 300 acres down to two to three percent of all wildfire ignitions over a ten year period. Additional emphasis under Alternative E integrates the prepositioning of suppression resources and preventative actions similar to Alternative D. Prepositioning and preventative actions would increase the likelihood of successful fire management actions with response to wildfire. Fuels reduction treatments would be similar to Alternative B, with added emphasis on coordination of state and local agencies and individual landowners. While the general short-term impacts fire and fuels conservation measures on mule deer would be the same as those described under Alternative A, the long-term beneficial effects of the measures on mule deer would be similar to those of Alternative B.

#### Cumulative Effects

The cumulative effect of management actions under Alternative E, when combined with the past, present and reasonably foreseeable future actions are similar to the cumulative effects described in Alternative B, and are not expected to be substantial or remove or fragment sagebrush habitat

past a critical threshold within Management Zones III, IV and V (refer to Chapter 5 of the DEIS).

#### Wild Horse and Burro Management – Direct and Indirect Effects

Management under Alternative E would maintain wild horses at AML in WHTs to avoid and minimize impacts on Sage-Grouse Management Areas, evaluate conflicts with WHT designations in Sage-Grouse Management Areas, modify Land and Resource Management Plans to avoid negative impacts on GRSG and, if necessary, resolve conflicts between the Wild and Free Roaming Horse and Burro Act and the Endangered Species Act. Wild horse and burro management under Alternative E would be similar to Alternative A. Therefore, impacts to mule deer are expected to be similar to that of Alternative A.

#### Cumulative Effects

Portions of Management Zone III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories. Forest Service-administered lands within Management zones IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); see Chapter 5 of the DEIS]. Under Alternative E, wild horse and burro Territories would be managed for Appropriate Management Level as under current management. Therefore, the direct and indirect effects of wild horse and burro management to mule deer in Management Zones III, IV and V from the management actions under Alternative E, which would be largely neutral for mule deer, when combined with the past, present and reasonably foreseeable future actions, would not substantially increase impacts to mule deer or sagebrush habitat.

#### Energy and Locatable Minerals Development – Direct and Indirect Effects

The Alternative E management strategy would be to avoid conflicts with GRSG habitat by siting new minerals and energy facilities and activities outside of habitat wherever possible. Projects that have an approved BLM notice, plan of operation, right-of-way, or drilling plan would be exempt from any new mitigation requirements above and beyond what has already been stipulated in the projects' approvals. Exploration projects would be designed for mineral access and the betterment of GRSG habitat. Roads and other ancillary features that impact GRSG habitat would be designed to avoid where feasible and otherwise minimize and mitigate impacts in the short and long term. New linear features would be sited in existing corridors or, at a minimum, co-located with existing linear features in SGMAs. Energy developers would be required to work closely with state and federal agency experts to determine important GRSG nesting, brood rearing and winter habitats and avoid those areas, and energy development or infrastructure features would be restricted within a 0.6 mile (1 km) radius around seeps, springs and wet meadows within identified brood rearing habitats wherever possible. Alternative E does not provide fixed exclusion or avoidance areas, leaving all management subject to an avoid, minimize, and mitigate approach, which provides a lower level of certainty than alternatives that have fixed exclusion and avoidance land allocations based on PPH and PGH designations. Under Alternative E, there would be the possibility for more land use for both energy and minerals development than under Alternative A, because construction of projects within or adjacent to sagebrush habitat would not be ruled out. Therefore, the general impacts of energy and locatable minerals development on mule deer discussed under Alternative A would have the potential to increase under Alternative E.



### Cumulative Effects

Energy development is currently a minor threat present only in Management Zone III but geothermal energy development potential is high throughout Management Zone IV (refer to Chapter 5 of the DEIS). Mining is common across Management Zones III and IV in Nevada and occurs at a variety of scales. Under Alternative E, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), there would be no fixed exclusion or avoidance areas, as under Alternatives B, C, D or F, leaving all management subject to an avoid, minimize, and mitigate approach, which provides a lower level of certainty than alternatives that have fixed exclusion and avoidance land allocations based on habitat designations. In addition, there would be the possibility for more land use for both energy and minerals development than under Alternative A, because construction of projects within or adjacent to GRSG habitat would not be ruled out. Therefore, under Alternative E, the direct and indirect effects of energy and locatable minerals development, in conjunction with the past, present and reasonably foreseeable future actions, may result in the increased loss and fragmentation of the existing sagebrush habitat in Management Zones III, IV or V (refer to Chapter 5 of the DEIS).

### Land Uses and Realty Management – Direct and Indirect Effects

Under Alternative E, no areas would be subject to exclusion or avoidance, but habitat disturbance, including habitat improvement projects, in Occupied and Suitable Habitat would be limited to not more than five percent per year, and in Potential Habitat to not more than twenty percent per year, per SGMA, unless habitat treatments show credible positive results. On federal lands in Nevada with pre-approved activities, no new mitigation would take place beyond previously approved in Plans of Development, right of ways, or drilling plans. General guidance would be to avoid when possible, minimize adverse effects as practicable, and mitigate adverse effects in Occupied or Suitable Habitat. Whenever possible, this alternative would locate facilities in non-habitat areas, site new linear features in existing corridors or co-locate them with other existing features and engage in reclamation and weed control efforts. This alternative provides fewer measures when compared to Alternatives A, B, C, D or F to reduce the general impacts of land uses and realty management described under Alternative A to mule deer and sagebrush habitats. Therefore, Alternative E would not be as protective of mule deer and sagebrush habitat as any of the other alternatives.

### Cumulative Effects

Management actions associated with land uses and realty under Alternative E would not include specific exclusion or avoidance areas but would limit total disturbance within Occupied and Suitable Habitats and implement an avoid, minimize, mitigate approach, as discussed above. This would provide a lower level of certainty for sagebrush habitat protection under Alternative E than under alternatives that have fixed exclusion and avoidance areas based on habitat designations and could lead to greater habitat fragmentation under Alternative E. Therefore, the direct and indirect effects land uses and realty management under Alternative E, in conjunction with the past, present and reasonably foreseeable future actions, may result in the increased loss and fragmentation of the existing sagebrush habitat in Management Zones III, IV or V (refer to Chapter 5 of the DEIS).

### Travel, Transportation and Recreation Management – Direct and Indirect Effects

Under Alternative E, travel, transportation and recreation management would essentially remain the same as it currently is under Alternative A. Therefore, impacts to mule deer and sagebrush habitat under Alternative E are expected to be similar to those of Alternative A.

#### Cumulative Effects

Recreation is considered a “lesser threat” with respect to “relative cumulative actions” addressed in the DEIS and only for Management Zone V (see Chapter 5 of the DEIS). Current travel, transportation and recreation management as it exists under Alternative A would continue under Alternative E. The limitation of motorized travel to existing routes and permitting of recreational SUAs that are neutral or beneficial to sage-grouse, as well as limited opportunities for road construction and upgrading of current roads, would not be instituted as they would be in Alternatives B, C, D and F. Under Alternative E, the direct and indirect effects from travel, transportation and recreation management, in conjunction with the past, present and reasonably foreseeable future actions, may result in the increased loss and fragmentation of the existing sagebrush habitat in Management Zones III, IV and V (refer to Chapter 5 of the DEIS).

### **Alternative F**

#### Vegetation and Soils – Direct and Indirect Effects

Unlike Alternative B, Alternative F includes a conservation measure specifically directed at invasive plants that would develop and implement methods for prioritizing and restoring sagebrush steppe invaded by nonnative plants. Like Alternative B, Alternative F would manage pinyon-juniper encroachment under current direction (see Alternative A). In addition, GRSG vegetation management conservation measures would benefit weed and conifer control efforts by prioritizing restoration efforts, including reducing invasive plants, and monitoring and controlling invasive species after fuels treatments and at existing new range improvements in all occupied GRSG habitat (PPH and PGH as opposed to only PPH under Alternative B). Together, these measures would result in a net benefit to sagebrush habitat and, therefore, mule deer by reducing impacts from invasive plants and pinyon-juniper encroachment on sagebrush habitat, as described under Alternative A, more so than Alternative B although the effects of the treatments would be the same.

#### Cumulative Effects

Under Alternative F, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), current vegetation and soils management treatments, including mechanical, manual, chemical, and biological control of invasive plants and pinyon and juniper, would continue and the short-term negative impacts of these activities on mule deer and sagebrush habitats would continue to be outweighed by the long-term beneficial impacts including increased forage, cover quality and composition, decreased fire spread and intensity and potentially increased water availability. However, additional emphasis on protecting existing sagebrush habitat under Alternative F would provide an added benefit to mule deer. Therefore, the direct and indirect effects of vegetation and soils management to mule deer in Management Zones III, IV and V from the management actions under Alternative F, which would be largely beneficial for mule deer, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to mule deer or sagebrush habitat.

### Livestock Grazing – Direct and Indirect Effects

Alternative F would include beneficial management actions similar to those of Alternative B except they would apply in all GRSG habitats. These include completion of Land Health Assessments, consideration of grazing methods and systems to reduce impacts on sage-grouse habitat, consideration of retiring vacant allotments, improved management of riparian areas and wet meadows, evaluation of existing introduced perennial grass seedings, authorization of new water developments and structural range improvements only when beneficial to GRSG, and fence removal, modification or marking. Together these efforts would reduce the impacts from grazing on mule deer described under Alternative A to a larger degree than Alternative B and expand the beneficial impacts discussed under Alternative B over a larger area.

### Cumulative Effects

Although livestock grazing occurs throughout all management zones, in the DEIS it is only considered a “lesser threat” with respect to “relative cumulative actions” and only for Management Zone V (see Chapter 5 of the DEIS). In addition, portions of Management Zone III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories which have the potential to compound the effects of livestock grazing on these lands; Forest Service-administered lands within Management zones IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); see Chapter 5 of the DEIS].

Under Alternative F, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), livestock grazing would continue to be managed through existing grazing plans. Wild horse and burro Territories would be managed for Appropriate Management Level. However, additional emphasis on protecting existing sagebrush habitat under Alternative F would provide an added benefit to mule deer. Therefore, the direct and indirect effects of livestock grazing and wild horse and burro management to mule deer in Management Zones III, IV and V from the management actions under Alternative F, which would be largely beneficial for mule deer, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to mule deer or sagebrush habitat.

### Fire and Fuels – Direct and Indirect Effects

The types of fire and fuels related impacts of Alternative F on mule deer would be similar to those discussed for Alternative B; however because Alternative F expands most GRSG conservation elements to all occupied habitat rather than limiting them to PPH, the area over which those impacts, both beneficial and negative, could occur would be larger. Elements of Alternative F that differ from those of Alternative B, and would be the most likely to result in differences in the extent of direct and indirect beneficial and negative impacts on mule deer and sagebrush habitat between the two alternatives, include the following: (1) prioritizing suppression in all occupied habitat (similar to Alternative C), compared to only PPH; (2) excluding livestock grazing from burned areas in GRSG occupied habitat until woody and herbaceous plants achieve GRSG habitat objectives; and (3) applying fuels management treatment provisions (including post-fire revegetation and invasive species control) to all occupied habitat rather than limiting them to PPH.

### Cumulative Effects

The cumulative of management actions under Alternative F, when combined with the past, present and reasonably foreseeable future actions are similar to the cumulative effects described in Alternative B, and are not expected to be substantial or remove or fragment sagebrush habitat past a critical threshold within Management Zones III, IV and V (refer to Chapter 5 of the DEIS).

#### Wild Horse and Burro Management – Direct and Indirect Effects

Wild horse and burro management under Alternative F would be similar to that proposed under Alternative B except all conservation measures, but the measure prioritizing gathers in PPH, would extend to all occupied GRSG habitat. Therefore, the beneficial impacts on mule deer under Alternative F would be the same as those under Alternative B except they would apply to all occupied GRSG habitat making Alternative F more protective of mule deer and mule deer habitat than Alternative B.

### Cumulative Effects

Refer to Alternative B. Cumulative effects would be the same.

#### Energy and Locatable Minerals Development – Direct and Indirect Effects

Energy and locatable minerals development is similar to proposed management under Alternative B. Under Alternative F, siting of wind energy development would be prevented in PPH; PPH would be closed to new fluid mineral leasing, nonenergy leasable mineral leasing, and mineral material sales; it would be proposed for withdrawal from mineral entry; no new surface occupancy (NSO) would be stipulated for leased fluid minerals and a 3% disturbance cap would be applied. Numerous conservation measures would be implemented to reduce impacts from mineral exploration and development activities in PPH. Like Alternative B, Alternative F does not include specific management for locatable, or saleable or nonenergy minerals in PGH. Unlike Alternative B, Alternative F directly addresses wind energy and fluid minerals development outside of PPH: wind energy would be sited at least five miles from active sage-grouse leks and at least four miles from the perimeter of sage-grouse winter habitat and areas within 4 miles of active sage-grouse leks would be closed to new fluid minerals leasing. Alternative F, although similar to Alternative B, would reduce the impacts of energy development on mule deer and mule deer habitat, as described under Alternative A, more so than Alternative B because it addresses siting of wind energy and fluid minerals leasing outside of PPH more thoroughly than Alternative B.

### Cumulative Effects

Energy development is currently a minor threat present only in Management Zone III but geothermal energy development potential is high throughout Management Zone IV (refer to Chapter 5 of the DEIS). Mining is common across Management Zones III and IV in Nevada and occurs at a variety of scales. Management actions associated with energy and locatable minerals development under Alternative B would increase protection of sagebrush habitat, primarily within PPH, thereby benefitting mule deer rather than removing or fragmenting habitat. Under Alternatives B, within Management Zones III and IV, some of the current energy and locatable minerals management direction would continue, however, additional emphasis on protecting existing sagebrush habitat by adding all PPH to existing closures and proposing it for withdrawal

would be included. Therefore, the direct and indirect effects of energy and locatable minerals development to mule deer in Management Zones III, IV and V from the management actions under Alternative B, which would be largely beneficial for mule deer, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to mule deer or sagebrush habitat.

#### Land Uses and Realty Management – Direct and Indirect Effects

Land uses and realty management under Alternative F would essentially be the same as that under Alternative B. Please refer to Alternative B. The effects on mule deer and sagebrush habitat would be the same.

#### Cumulative Effects

Management actions associated with land uses and realty under Alternative F would increase protection of sagebrush habitat, thereby benefitting mule deer rather than removing or fragmenting habitat. Under Alternative F, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), some of the current land and realty operations would continue, however, additional emphasis on protecting existing sagebrush habitat and preventing disturbance to GRSG would be included. Lands and realty management activities would focus ROW exclusion or avoidance areas in Greater Sage-Grouse habitat. Therefore, the direct and indirect effects of lands and realty management to mule deer in Management Zones III, IV and V under Alternative F, which would be largely beneficial for mule deer, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to mule deer or their habitat.

#### Travel, Transportation and Recreation Management – Direct and Indirect Effects

With respect to travel, transportation and recreation, Alternative F is similar to Alternative B: within PPH, only recreational SUAs that are neutral or beneficial to GRSG would be permitted, there would be limited opportunities for new route construction and upgrading of existing routes could only occur if they would not result in a new route category (road, primitive road, or trail) or capacity, unless it is necessary for motorist safety, or eliminates the need to construct a new road. In addition, Alternative F would expand the Alternative B measure restricting motorized travel to designated routes in PPH to include PGH, designated routes in sage-grouse priority habitat would be considered for closure, camping areas within 4 miles of active leks would seasonally be closed, permanent seasonal road or area closures to protect breeding, nesting and brood rearing sage-grouse would be implemented and new road construction would be prohibited within 4 miles of active sage-grouse leks. Therefore, the general travel, transportation and recreation effects of Alternative F on mule deer would be the same as those for Alternatives A and B, although Alternative F would be more protective, particularly with respect to reducing disturbance to mule deer and protecting sagebrush habitat from degradation and introduction of invasive weeds, than Alternative B due to the additional measures.

#### Cumulative Effects

Recreation is considered a “lesser threat” with respect to “relative cumulative actions” addressed in the DEIS and only for Management Zone V (see Chapter 5 of the DEIS). Management actions associated with travel, transportation and recreation under Alternative F would increase protection of sagebrush habitat within PPH and, in some instances, PGH and PPH, thereby

benefitting mule deer rather than removing or fragmenting habitat. Under Alternative F, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), some of the current travel, transportation and recreation management direction would continue, however, additional emphasis on protecting existing sagebrush habitat would be included. Therefore, the direct and indirect effects of travel, transportation and recreation management to mule deer in Management Zones III, IV and V under Alternative D, which would be largely beneficial for mule deer, when combined with the past, present and reasonably foreseeable future actions, would not substantially increase impacts to mule deer.

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for the  
  
Greater Sage-Grouse  
Conservation Effort to Amend the  
Forest Plans in Nevada  
  
for the  
  
Humboldt-Toiyabe National Forest Plans

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## I. INTRODUCTION

The purpose of this report is to identify the likely effects of the Greater Sage-Grouse (GRSG) Planning Decision for the Humboldt-Toiyabe National Forest on USDA Forest Service Region 4 sensitive species. Sensitive species for Region 4 are listed on the Regional Forester's sensitive species list and comprise plants, birds, mammals, amphibians, and fish. Species listed as threatened or endangered by the USFWS are addressed in the biological assessment prepared for this project.

This Wildlife and Sensitive Plant Specialists Report addresses sensitive species that meet the following criteria:

- 1) Species that are known to occur on any of the National Forest system lands listed above based on confirmed sightings.
- 2) Species that may occur on any of the National Forest system lands listed above based on reliable unconfirmed sightings.
- 3) Species that may occur on any of the National Forest system lands listed above based on the presence of potential habitat.

**Forest Service Policy** - The USDA Forest Service has developed policy regarding the designation of plant and animal species (Forest Service Manual (FSM) 2670; Supplement 2600-94-2). The Regional Forester's sensitive species list contains taxa only when they meet one or more of the following three criteria:

- 1) The species is declining in numbers or occurrences and evidence indicates it could be proposed for federal listing as threatened or endangered if action is not taken to reverse or stop the downward trend.
- 2) The species' habitat is declining and continued loss could result in population declines that lead to federal listing as threatened or endangered if action is not taken to reverse or stop the decline.
- 3) The species' population or habitat is stable but limited.

**Forest Service Objectives**- Under FSM 2672.41, the objectives for completing biological evaluations for proposed Forest Service programs or activities are:

- 1) To ensure that Forest Service actions do not contribute to loss of viability of any native or desired non-native plant or contribute to animal species or trends toward Federal listing of any species listed as sensitive by USDA Forest Service Region 2.
- 2) To comply with the requirements of the Endangered Species Act, actions of Federal agencies should not jeopardize or adversely modify critical habitat of federally listed species.
- 3) To provide a process and standard by which to ensure that threatened, endangered, proposed, and sensitive species receive full consideration in the decision making process, and to enhance opportunities for mitigation.

FSM 2670.22 #2 includes the following objective for sensitive species: "Maintain viable populations of all native and desired nonnative wildlife, fish, and plant species in habitats distributed throughout their geographic range on National Forest System Lands." FSM 2600, Section 2671.44 (Supplement 2600-94-2) provides direction on the review of actions and



programs authorized, funded or implemented by the Forest Service relative to the requirements of the Endangered Species Act.

## **II. PROJECT HISTORY**

Greater Sage-Grouse has emerged as a significant conservation concern over the last 10 years. The species is currently a candidate species for listing under the Endangered Species Act inferring that listing is “warranted, but precluded due to higher priorities” because of two primary factors: (1) the large-scale loss and fragmentation of habitats across the species range; and (2) a lack of regulatory mechanisms in place to ensure the conservation of the species. The primary threats to sage-grouse habitat are summarized in the listing decision. The two dominant threats are related to infrastructure associated with energy development in the eastern portion of the species range, and the conversion of sagebrush communities to annual grasslands associated resulting in large uncharacteristic wildfires in the western portion of the species range (U.S. Fish and Wildlife Service 2010).

The Bureau of Land Management (BLM) manages approximately half of the Greater Sage-Grouse habitats, whereas the Forest Service (FS) manages approximately 8 percent of species habitat, with most of that occurring on national forests in the Intermountain Region. The Forest Service manages approximately 9 million acres of sage-brush habitats, of which about 7.5 million acres occurring in the Intermountain Region. Most habitats on FS administered lands contribute to summer brood-rearing habitats, although some forests and grasslands do contribute important breeding nesting and winter habitat.

In 2011 and 2012, the United States Fish and Wildlife Service (USFWS) submitted letters to the BLM and FS recommending that the agencies amend Land Use Plans to provide adequate regulatory mechanisms to conserve the species. Originally, this recommendation identified 10 National Forests viewed as “high priority” to ensure appropriate regulatory mechanisms. Following scoping and discussion the FS added an additional 10 Forest Plans that would be considered for amendment. The FS is participating in several joint Environmental Impact Statements (EISs) with the BLM to develop Records of Decision that will be used as a basis for amending Land Use Plans, including Forest Plans.

Since half of all Greater Sage-Grouse habitat occurs on BLM lands, the BLM is leading the effort to amend or revise land use plans, with the Forest Service as a cooperating agency. The purpose is to provide direction in land management plans that conserve and protect sage-grouse habitat and to provide assurances to the U.S. Fish and Wildlife Service that adequate regulatory mechanisms are in place to ensure the conservation of the species. EISs will be completed for seven sage-grouse planning subregions: 1) eastern Montana and portions of North and South Dakota, 2) Idaho and southwest Montana, 3) Oregon, 4) Wyoming, 5) northwest Colorado, 6) Utah, and 7) Nevada and northern California. The FS is participating in six of these EISs (excluding Eastern Montana/Dakotas and some of the areas in Wyoming). The EISs will include joint agency signatures, but separate Records of Decision.”

This Wildlife and Sensitive Plant Specialists Report is being prepared to address National Forest System-administered lands in support of the Nevada and northern California EIS. The

Humboldt-Toiyabe National Forest in Nevada is planning to amend their respective Land and Resource Management Plans for the Greater Sage-Grouse.

### **III. PURPOSE AND NEED**

The purpose of the Land and Resource Management Plan amendments for the Greater Sage-Grouse is to identify and incorporate appropriate conservation measures to conserve, enhance, and/or restore sage-grouse habitat by reducing, eliminating, or minimizing threats to their habitat. The need to create this amendment arose when the inadequacy of regulatory mechanisms was identified as a significant threat in the USFWS finding on the petition to list the Greater Sage-Grouse. The USFWS identified conservation measures within Forest Service Land and Resource Management Plans (as well as BLM Land Use Plans) as the principal regulatory mechanisms for habitat conservation. Therefore, the Land and Resource Management Plan amendments will focus on areas affected by threats to sage-grouse habitat identified by the USFWS in the March 2010 listing decision (USFWS 2010).

### **IV. DESCRIPTION OF THE ALTERNATIVES**

#### **Alternative A:**

Under the No Action Alternative, the Forest Land and Resource Management Plans would not be amended. Current plans direction and prevailing conditions set forth in the plans for sage-grouse and sagebrush habitats would continue. The No Action Alternative highlights those decisions that can be shown to have a direct effect or link to conserving or restoring Greater Sage-Grouse habitat or sagebrush vegetation communities that support Greater Sage-Grouse throughout its life cycle. Goals and objectives for BLM- and Forest Service-administered lands and mineral estate would not change. Appropriate and allowable uses and restrictions pertaining to activities such as mineral leasing and development, recreation, construction of utility corridors, and livestock grazing would also remain the same. The BLM and Forest Service would not modify existing or establish additional criteria to guide the identification of site-specific use levels for implementation activities.

#### **Alternative B:**

Greater Sage-Grouse conservation measures in A Report on National Greater Sage-Grouse Conservation Measures [Sage-grouse National Technical Team (NTT) Report 2011] were used to form BLM and Forest Service management direction under Alternative B. To ensure BLM and Forest Service management actions are effective and based on the best available science, the BLM's National Policy Team created a National Technical Team in August 2011. The BLM's objective for chartering this planning strategy effort was to develop new or revised regulatory mechanisms, through land use plans, to conserve and restore Greater Sage-Grouse and its habitat on BLM-administered and National Forest System lands on a range-wide basis over the long term. Conservation measures in the report are focused primarily on Greater Sage-Grouse preliminary priority habitat (PPH) areas. PPH areas have the highest conservation value to maintaining or increasing sage-grouse populations. See Chapter 2 of the DEIS for additional information.

### **Alternative C:**

During scoping individuals and conservation groups had the opportunity to submit management direction recommendations for protection and conservation of Greater Sage-Grouse and its habitat. Western Watersheds Project (WWP) submitted a complete alternative proposal in their scoping comment letter. The recommendations by WWP, in conjunction with resource allocation opportunities and internal sub-regional BLM and Forest Service input, were reviewed to develop BLM and Forest Service management direction for Greater Sage-Grouse under Alternative C. Conservation measures in Alternative C are mostly focused on all occupied Greater Sage-Grouse habitat areas: PPH and preliminary general habitat (PGH). Refer to Chapter 2 of the DEIS for additional information.

### **Alternative D:**

Alternative D is the BLM and Forest Service, Nevada and Northeastern California Sub-region's adjustments alternative, which emphasizes balancing resources and resource use among competing human interests, land uses, and the conservation of natural and cultural resource values, while sustaining and enhancing ecological integrity across the landscape, including plant, wildlife, and fish habitat. This alternative modifies the recommendations from the NTT Report to provide a balanced level of protection, restoration, enhancement, and use of resources and services to meet ongoing programs and land uses. The goal of the agency developed alternative is to provide for no unmitigated loss to sage-grouse. No unmitigated loss is described as follows: Continued losses of sage-grouse habitat through natural events such as wildfire are expected to continue. Therefore, it is incumbent on the BLM and Forest Service to minimize loss of habitat or habitat functionality arising from discretionary agency actions or authorizations. The concept of "no unmitigated loss" includes a suite of actions that can be taken to off-set or restore direct and indirect disturbances on Greater Sage-Grouse habitat. See Chapter 2 of the DEIS for additional information.

### **Alternative E:**

Alternative E is based on the State of Nevada's Conservation Plan for Greater Sage-Grouse in Nevada and would apply to all BLM- and Forest Service-administered lands in Nevada. The State of California did not submit a proposal for a complete alternative and as such, Alternative E would only apply to BLM and Forest Service-administered lands in Nevada. The goals, objectives, and actions under Alternative E reflect concurrent state-level planning efforts for the protection of Greater Sage-Grouse and its habitat. Since state-level planning efforts focus on all lands within the state, regardless of ownership, certain actions under Alternative E would not be legally implementable on public lands unless these lands were incorporated into the federal decision.

The Nevada State Plan identifies 15 sage-grouse management areas (SGMAs) located across the state (refer to Chapter 2 of the DEIS). The Sage-Grouse Management Area map defines the overall area where the state would like resources to be managed to maintain and expand Sage-Grouse populations (refer to Chapter 2 of the DEIS). The State of Nevada Sage-Grouse Management Area map is based on the best biological information and knowledge at this time, taking into account the 85 percent breeding bird density, Nevada Department of Wildlife's

(NDOW's) Preliminary Priority and General Habitat maps, and areas of known resource conflicts. Refer to Chapter 2 of the DEIS for additional information.

### **Alternative F:**

Similar to Alternative C, Alternative F is based on recommendations submitted by individuals and conservation groups (including Wild Earth Guardians) for the protection and conservation of Greater Sage-Grouse and its habitat. Alternative F includes similar goals, objectives, and actions as Alternative C, but with notable differences, particularly related to grazing, lands and realty, and minerals. Like Alternative C, conservation measures in Alternative F are mostly focused on all occupied Greater Sage-Grouse habitat areas (PPH and PGH). See Chapter 2 of the DEIS for additional information.

## **V. ANALYSIS AREA**

The planning area is the geographic area within which the BLM and Forest Service will make decisions during this planning effort. The planning area boundary includes all lands regardless of jurisdiction (Figure 1). For the EIS and LUP amendments, the planning area is the entire sub-region. Lands addressed in the LUP amendments will be lands (including surface and split estate lands with BLM subsurface mineral rights) managed by the BLM and Forest Service in Greater Sage-Grouse habitats. Any decisions in the LUP amendments will apply only to BLM-or Forest Service-administered lands (Decision Area). The LUP amendments will be limited to making land use planning decisions specific to the conservation of Greater Sage-Grouse and their habitat.

The Humboldt-Toiyabe National Forest administers two forest LRMPs that will also be amended by this LUP amendment/EIS. Lands within the planning area include a mix of private, federal, and state lands.

The planning area incorporates PPH and PGH (Figure 2). Though the planning area includes private lands, decisions in this amendment are made only for BLM-administered, and Forest Service-administered lands. Management direction and actions outlined in the EIS apply only to these BLM-and Forest Service-administered lands in the planning area and to federal mineral estate under BLM jurisdiction that may lie beneath other surface ownership. See Chapter 1 of the DEIS. This analysis focuses solely on National Forest-administered lands within the analysis area.





# Nevada/California Greater Sage-Grouse EIS

## EIS Boundaries and Associated National Forests

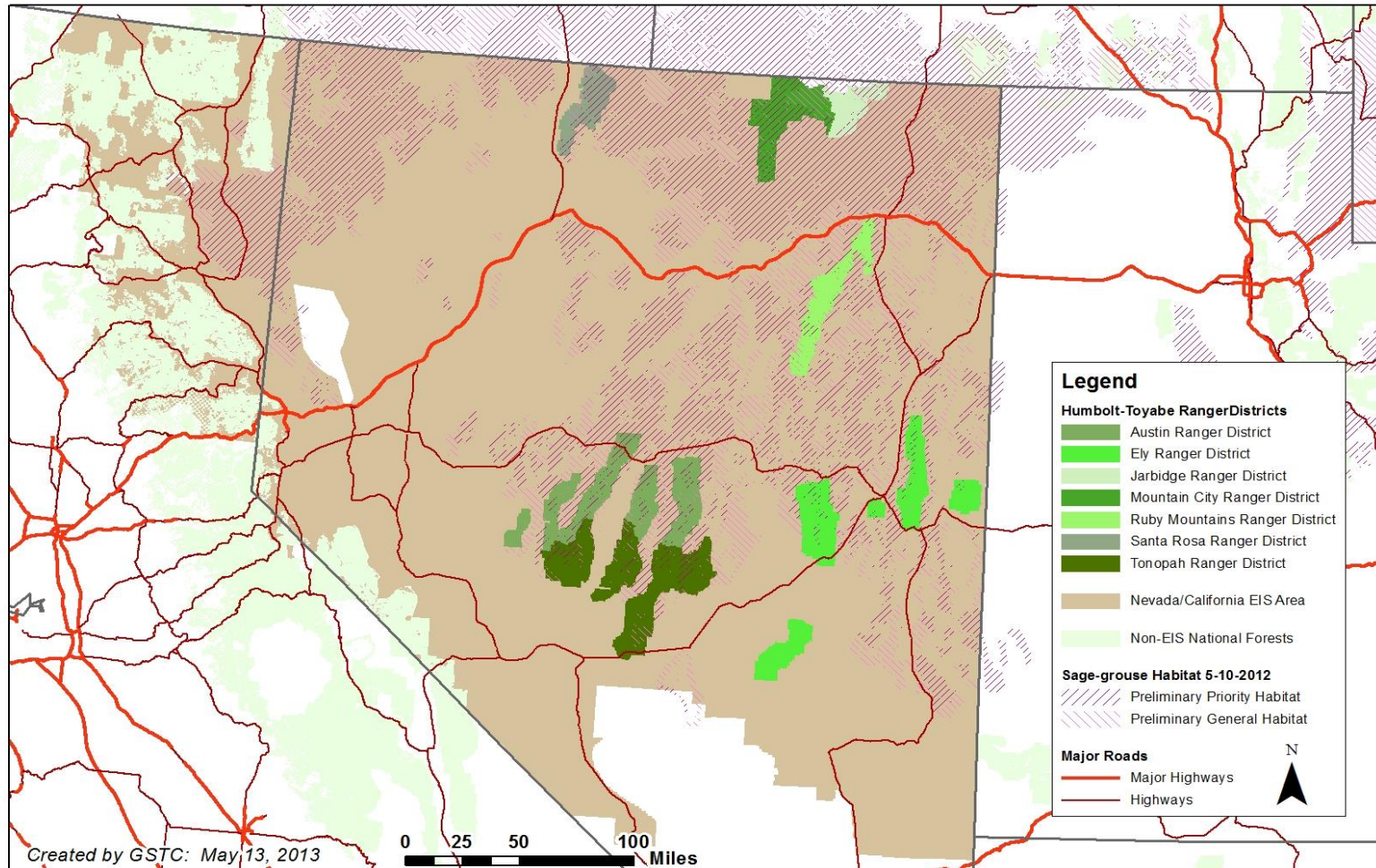


Figure 1. Nevada and northeastern California EIS analysis area showing National Forest-administered lands



# Preliminary Priority and General Sage-Grouse Habitat and WAFWA Management Zones

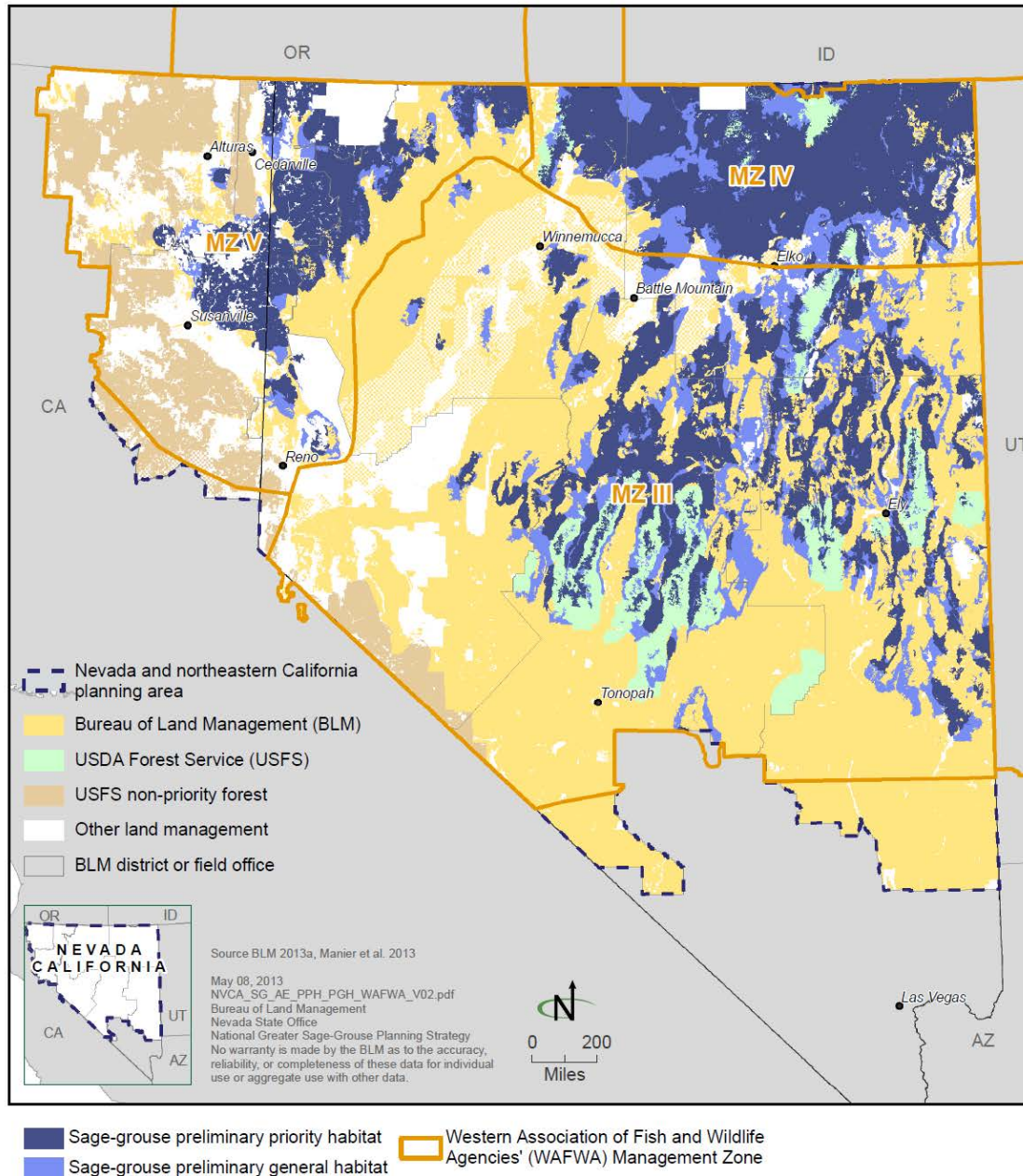


Figure 2. Nevada and northeastern California analysis showing PPH, PGH and Western Association of Fish and Wildlife Agencies (WAFWA) management zones



## VII. SPECIES CONSIDERED IN THE ANALYSIS

### THREATENED, ENDANGERED, PROPOSED AND CANDIDATE SPECIES

A Biological Assessment (BA) will be prepared for the selected alternative developed for the Record of Decision and will be included with the FEIS developed for this project. The BA will conform to the legal requirements set forth under section 7 of the Endangered Species Act (ESA) (19 U.S.C. 1536 (c), 50 CFR 402.12 (f) and 402.14). Section 7(a) (1) of the ESA requires federal agencies to use their authorities to further the conservation of listed species. Section 7(a) (2) requires that federal agencies ensure any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of federally-listed species, or destroy or adversely modify designated critical habitat. A Biological Assessment must be prepared for federal actions to evaluate the potential effects of the proposal on listed or proposed species. The contents of the BA are at the discretion of the federal agency, and will depend on the nature of the federal action (50 CFR 402.12(f)).

A BA is not included with this DEIS. This section of the Wildlife Specialist Report provides preliminary background information that will be utilized in the development of a BA, for the selected alternative, and also provides insight into the currently anticipated effects to threatened, endangered, proposed and candidate species. Species identified by the USFWS as ‘candidate’ species have no ESA protections but by USFS policy, they are designated as Regional Forester ‘sensitive species’ and afforded special management attention by the US Forest Service. They are analyzed in the Biological Evaluation developed for the FEIS and are discussed in the sensitive species section of this specialist report, if they occur on the RNF.

A list of threatened, endangered, proposed, and candidate (TEPC) species was determined for this project in consultation with the USFWS. Close coordination with USFWS will continue throughout the project. Table 1 is the list of TEPC species likely to be included in the Biological Assessment prepared for the selected alternative. Overall it is generally assumed that implementation of any of the action alternatives that adds additional conservation measures for greater sage-grouse may also result in indirect positive outcome for other listed species associated with sage-grouse or sagebrush habitats, if they occur in the area where the conservation measures are applied. Negative consequences to other listed species are not envisioned as an outcome of selection of any of the alternatives.

Table 1. Federally listed threatened, endangered, proposed and candidate species in the planning area.

Species	Federal Status	Designated Critical Habitat in Planning Area
<b>Birds</b>		
Yellow-billed cuckoo <i>Coccyzus americanus</i>	Candidate	
Greater sage-grouse <i>Centrocercus urophasianus</i>	Candidate	

Species	Federal Status	Designated Critical Habitat in Planning Area
Southwestern willow flycatcher <i>Empidonax traillii extimus</i>	Endangered	Yes
Yuma clapper rail <i>Rallus longirostris yumanensis</i>	Endangered	
<b>Fishes</b>		
Bull trout <i>Salvelinus confluentus</i>	Threatened	
Lahontan cutthroat trout <i>Oncorhynchus clarki henshawi</i>	Threatened	
Warner sucker <i>Catostomus warnerensis</i>	Threatened	
Cui-ui <i>Chasmistes cujus</i>	Endangered	
Desert dace <i>Eremichthys acros</i>	Threatened	Yes
Clover Valley speckled dace <i>Rhinichthys osculus oligoporus</i>	Endangered	
Ash Meadows Amargosa pupfish <i>Cyprinodon nevadensis mionectes</i>	Endangered	
Ash Meadows speckled dace <i>Rhinichthys osculus nevadensis</i>	Endangered	
White River spinedace <i>Lepidomeda albilalis</i>	Endangered	Yes
Warm Springs pupfish <i>Cyprinodon nevadensis pectoralis</i>	Endangered	
Hiko White River springfish <i>Crenichthys baileyi grandis</i>	Endangered	Yes
<b>Insects</b>		
Carson wandering skipper <i>Pseudocopaodes eunus obscurus</i>	Endangered	
<b>Reptiles and Amphibians</b>		
Columbia spotted frog <i>Rana luteiventris</i>	Candidate	
Oregon spotted frog <i>Rana pretiosa</i>	Candidate	
<b>Plants</b>		
Steamboat buckwheat <i>Eriogonum ovalifolium</i> var. <i>williamsiae</i>	Endangered	

## FOREST SERVICE SENSITIVE SPECIES

The following sensitive species list is composed of plants, birds, mammals, amphibians, fish, and invertebrates. We conducted a review for Region 4 sensitive species occurring within the Humboldt and Toiyabe National Forests that may overlap with the range of the GRSG or be affected by activities associated with the Planning EIS and subsequent Region 4 Plan Amendments for the Greater Sage-Grouse. Existing occurrence information, as well as known or potential habitat, was obtained from Humboldt and Toiyabe National Forests, Nevada



Department of Wildlife (NDOW), Great Basin Bird Observatory (GBBO), Nevada Bat Working Group, Nevada Natural Heritage Program (NNHP), and NatureServe (2010, 2013).

Table 2 lists Forest Service sensitive species known or suspected to exist on the aforementioned national forests. Threatened, endangered, proposed and candidate species are addressed separately in the biological assessment prepared for this project. All of the species in Table 2 were considered in this analysis and compared to the five criteria listed below. The five criteria were used to identify species that would experience “no impact” from the implementation of the action alternatives and could therefore be eliminated from detailed analysis. These numerical categories below are referred to in Table 2:

- 1 Analysis area is outside species’ range.
- 2 Potential habitat for the species does not exist within greater sage-grouse habitat (sagebrush-steppe) or is outside the elevation range of the greater sage-grouse.
- 3 The type or intensity of the activity in the proposed action is expected to have no impact/effect on these species or their habitat.
- 4 Individual animals may be accidental, dispersing, migrating, happenstance, vagrant, nomadic or opportunistic visitors to the habitat(s) impacted by the proposal, but no affiliation or dependence upon these habitat(s) has been shown.
- 5 The associated conservation design or mitigations eliminate any potential for impact to the species.

Species in Table 2 are likely to occur within or near the analysis area, or with potential habitat in or near the analysis area that may be affected (negatively or positively, directly, indirectly and/or cumulatively) by implementation of an action alternative were it carried forward into Table 3, and a more detailed analysis of the project effects was subsequently conducted.

Table 2. USDA Forest Service Region 4 sensitive species occurring or potentially occurring on the Humboldt-Toiyabe National Forest that may be influenced by an action alternative and will be further analyzed in this document.

SPECIES	HABITAT DESCRIPTION and RANGE	KNOWN OR SUSPECTED TO BE PRESENT IN ANALYSIS AREA?	EVALUATION CRITERIA	BIOLOGICAL DETERMINATION
<b>USFS REGION 4 SENSITIVE SPECIES</b>				
<b>MAMMALS</b>				
Bighorn sheep (includes Rocky Mountain bighorn sheep, California bighorn sheep and desert bighorn sheep) <i>Ovis Canadensis</i> (includes <i>O. c. canadensis</i> , <i>O. c.</i> , <i>californiana</i> , and <i>O. c. nelson</i> )	All subspecies rely on steep, high elevation habitats for spring and summer, including lambing. In winter, they move to lower elevations. Species also uses open areas of desert scrub, grasslands, shrub-steppe, cliffs, canyons, alpine, tundra, and barren landscapes. Migrates through Greater sage-grouse habitat.	Y	Not excluded	No impact
Pygmy rabbit <i>Brachylagus idahoensis</i>	Typically found in dense stands of big sagebrush growing in deep loose soils (4,500 to 7,450 feet) in desert, shrubland, chaparral, sagebrush communities	Y	Not excluded	See detailed analysis below
Spotted bat <i>Euderma maculatum</i>	Found in various habitats from low elevation desert scrub to high-elevation coniferous forest habitats, including pinyon-juniper, sagebrush or riparian habitats. Closely associated with rocky cliffs.	Y	Not excluded	See detailed analysis below
North American wolverine <i>Gulo gulo (luscus)</i>	Remote habitats within subalpine and montane forests	N	2	No impact
Townsend's western big-eared bat <i>Corynorhinus townsendii townsendii</i>	Current Nevada records indicate this species is distributed between 210 – 3,500 m (mean = 1,720 m +/- 421 m) primarily in pinyon-juniper-mahogany, white fir, blackbrush, sagebrush, salt desert scrub, agricultural, and occasionally in urban habitats.	Y	Not excluded	See detailed analysis below
Sierra Nevada red fox <i>Vulpes vulpes necator</i>	Restricted to Sierra Nevada.	N	1	No impact
<b>BIRDS</b>				
Bald eagle <i>Haliaeetus leucocephalus</i>	Found in coniferous forest and intermountain rivers and streams; nest in large trees near water, such as rivers, lakes, and coast shorelines, where they prey upon fish and waterfowl.	Y	4	No Impact

SPECIES	HABITAT DESCRIPTION and RANGE	KNOWN OR SUSPECTED TO BE PRESENT IN ANALYSIS AREA?	EVALUATION CRITERIA	BIOLOGICAL DETERMINATION
Greater Sage-Grouse <i>Centrocercus urophasianus</i>	Habitats used in Nevada include sagebrush, montane shrubland, wet meadow; agriculture, springs; montane riparian, aspen; and Great Basin Lowland Riparian with sagebrush species (esp. Wyoming big sagebrush, mountain big sagebrush, and low sagebrush), flowering forbs, agricultural crops (particularly alfalfa), variety of montane shrubs, aspen, alder, willow	Y	Not excluded	See detailed analysis below
Peregrine falcon <i>Falco peregrinus anatum</i>	At present, peregrine falcons in Nevada are concentrated around the Lake Mead NRA, where they nest on earthen and rock cliffs surrounding the reservoir. Their current range is likely related to limited recovery rather than habitat availability. They are occasionally found in other areas further north.	Y	4	No Impact
Mountain quail <i>Oreortyx pictus</i>	Not closely tied to any single habitat type, but instead tied to dense montane shrub and forb cover. Steep landscapes with intact coniferous forests, deciduous woodlands, and montane shrublands that exist in proximity to a stream represent ideal conditions. Patchy distribution. Overlaps with Greater sage-grouse in montane shrubland, but utilizes steeper terrain and different cover type (dense, tall shrubs vs. sagebrush) than GRSG.	Y	2, 3	No Impact
Flammulated owl <i>Otus flammeolus</i>	Hardwood and mixed forests, and hardwood and mixed woodlands; dense oak and oak-pine woodlands, from 6,000 to 10,000 feet. Typically nest in a variety of older conifer or aspen stands.	N	2	No Impact
White-headed woodpecker <i>Picoides albolarvatus</i>	Restricted to the Carson Range of western Nevada, which is the eastern edge of their range.	N	2	No impact
Three-toed woodpecker <i>Picoides tridactylus</i>	Mature stands with bark beetles, disease, and heart rot and recent stand-replacing burns with abundant wood-boring insects	N	2	No impact
Great gray owl <i>Strix nebulosa</i>	Mature forests that provide suitable nesting sites and foraging areas (seedling forests, meadows, and open riparian habitats adjacent to meadows), and large-diameter trees or snags	N	2	No impact

SPECIES	HABITAT DESCRIPTION and RANGE	KNOWN OR SUSPECTED TO BE PRESENT IN ANALYSIS AREA?	EVALUATION CRITERIA	BIOLOGICAL DETERMINATION
California Spotted Owl <i>Strix occidentalis occidentalis</i>	Primarily on the east side of the Sierra Crest, plus a few in the Carson Range. They are associated with large contiguous tracts of old-growth or late-seral coniferous forest.	N	1	No impact
Northern goshawk <i>Accipiter gentilis</i>	Typically inhabit late seral or old growth forests that have closed canopies (greater than 40 percent) and a relatively open understory. Goshawks are primarily nest in aspen ( <i>Populus tremuloides</i> ), but in Nevada, they sometimes nest in conifers. Goshawks use a wide variety of habitats for foraging.	N	2	No impact
Yellow-billed cuckoo <i>Coccyzus americanus</i>	Large blocks of riparian habitat with a dense understory of foliage. Their range is south of the range of the Greater sage-grouse.	N	2	No impact
<b>REPTILES AND AMPHIBIANS</b>				
Columbia spotted frog <i>Rana luteiventris</i>	Highly aquatic; within vicinity of relatively cold, perennial water (streams, rivers, springs and small lakes) of both woods and meadows	Y	3 <sup>1</sup>	No impact
Yosemite toad <i>Bufo canorus</i>	Occurs only in high Sierra Nevada, CA, wet mountain meadows and borders of forests from the vicinity of Grass Lake (Eldorado County) to south of Kaiser Pass and Evolution Lake (Fresno County), at elevations 1,460-3,630 meters (mostly above 2,740 meters)	N	1	No impact
Sierra Nevada yellow-legged frog <i>Rana sierrae</i>	East of the Sierra Nevada crest, <i>R. sierrae</i> occurs in the Glass Mountains just south of Mono Lake (Mono County) and along the east slope of the Sierra Nevada south to the type locality at Matlock Lake (Inyo County). <i>Rana sierrae</i> is now extirpated from NV and from large portions of the historical range in the Sierra Nevada of CA.	N	1	No impact
<b>FISH</b>				

<sup>1</sup> Subsequent review of the alternatives indicates that this species will experience no effects to its primary habitat or populations. None of the alternatives is expected to impact any of the identified limiting factors for this species or its life requirements. Based on these factors, the Columbia spotted frog will not be analyzed in additional detail.

SPECIES	HABITAT DESCRIPTION and RANGE	KNOWN OR SUSPECTED TO BE PRESENT IN ANALYSIS AREA?	EVALUATION CRITERIA	BIOLOGICAL DETERMINATION
Bonneville cutthroat trout <i>Oncorhynchus clarkii utah</i>	Bonneville Basin in relatively cool, well-oxygenated water with clean, well-sorted gravels and minimal fine sediments.	Y	3 <sup>2</sup>	No impact
<b>INSECTS</b>				
Spring Mountains acastus checkerspot <i>Chlosyne acastus robusta</i>	Arid, relatively open areas within pinyon-juniper woodlands and conifer woodlands in patches of yellow rabbitbrush, the species' larval host plant, intermixed with big sagebrush, mountain mahogany, sulfur-flower buckwheat, and/or rubber rabbitbrush. 5,970-8,730 ft. Endemic to Spring Mountains.	N	1	No impact
Spring Mountains dark blue <i>Euphilotes ancilla purpura</i>	Relatively open pinyon-juniper where scattered patches of sulfur-flower buckwheat, the species' larval host plant, occur in association with blackbrush at lower elevations and big sagebrush and mountain mahogany at higher elevations. 5,900-8,200 ft. Endemic to Spring Mountains.	N	1	No impact
Morand's checkerspot <i>Euphydryas anicia morandi</i>	Meadows, avalanche chutes and revegetated burned areas composed of bristlecone pine, mixed conifer, and pinyon-juniper vegetation. 6,690-11,290 ft. Endemic to Spring Mountains.	N	1	No impact
Mt. Charleston Blue Butterfly <i>Plebejus (=Icaricia) shasta charlestonensis</i>	Open habitats on flat or moderately sloped ridges, hilltops, or meadows surrounded by bristlecone pine, white fir, or ponderosa pine forest. Endemic to Spring Mountains.	N	1	No impact
<b>PLANTS</b>				
<i>Angelica scabrida</i> Charleston angelica	Moist calcareous-based substrates in montane coniferous forest communities and near springs on moist gravelly soils of washes, ephemeral streams, gullies, montane slopes and avalanche chutes. 4,040-9,350 ft. Endemic to Spring Mountains.	N	1, 2	No impact
<i>Antennaria arcuata</i> Meadow pussytoes	Seasonally moist areas in alkaline meadows, seeps, & springs, surrounded by silver sagebrush & grassland associations between 6,200 and 6,500 ft. Elko County NV. Also in ID and WY.	Y	Not excluded	See detailed analysis below

<sup>2</sup> Subsequent review of the alternatives indicates that this species will experience no effects to its primary habitat or populations. None of the alternatives is expected to impact any of the identified limiting factors for this species or its life requirements. Based on these factors, the Bonneville cutthroat trout will not be analyzed in additional detail.

SPECIES	HABITAT DESCRIPTION and RANGE	KNOWN OR SUSPECTED TO BE PRESENT IN ANALYSIS AREA?	EVALUATION CRITERIA	BIOLOGICAL DETERMINATION
<i>Antennaria soliceps</i> Charleston pussytoes	Open carbonate scree, talus, gravel, and crevices in the subalpine conifer, lower alpine, and upper montane conifer zones. 8,660-11,650 ft. Endemic to Spring Mountains.	N	1, 2	No impact
<i>Arenaria kingii</i> ssp. <i>rosea</i> Rosy King's Sandwort	Wooded slopes and ridges and associated with pinyon-juniper, montane coniferous forest, and lower subalpine coniferous zones. 6,560-9,550 ft. Endemic to Spring Mountains.	N	1	No impact
<i>Asclepias eastwoodiana</i> Eastwood milkweed	Mixed desert shrub, sagebrush, and pinyon-juniper in open areas frequently in small washes or other moisture-accumulating microsites. 3,000-7,080 ft. Nevada endemic documented from Esmeralda, Lander, Lincoln, and Nye Counties.	Y	Not excluded	See detailed analysis below
<i>Astragalus aequalis</i> Clokey milkvetch	Pinyon-juniper, mountain mahogany, ponderosa pine on basic soils, including alkaline clay and sand, gypsum, calcareous alluvial gravels, and carbonate rock outcrops. 5,970-8,400 ft. Endemic to Spring Mountains	N	1	No impact
<i>Astragalus johannis-howellii</i> Long Valley milkvetch	Sagebrush on sandy rhyolitic soils on flats and gentle slopes, usually in swales of former or present hot springs. 6,700-8,400 ft. NV distribution limited to Mineral County. Also in CA.	N	1	No impact
<i>Astragalus lentiginosus</i> var. <i>latus</i> Broad-pod freckled milkvetch	Pinyon-juniper on gravelly or sandy calcareous soils, generally on moderate to steep slopes. 5,700 to 9,900 ft. NV endemic documented from Elko and White Pine Counties.	Y	Not excluded	See detailed analysis below
<i>Astragalus oophorus</i> var. <i>clokeyanus</i> Lee Canyon milkvetch	Pinyon-juniper and mixed conifer communities on moist to dry soils, in openings of forests, shrublands, and woodlands. 5,400-8,990 ft. Endemic to Spring Mountains.	N	1	No impact
<i>Astragalus oophorus</i> var. <i>lavinii</i> Lavin's Egg milkvetch	Pinyon-juniper and sagebrush on relatively barren slopes, knolls, badlands, or outcrops, derived from volcanic ash or carbonate, usually on northeast to southeast aspects. 5,700 - 7,467 ft. In NV known only from Douglas, Lyon and Mineral Counties.	N	1	No impact
<i>Astragalus remotus</i> Spring Mountain milkvetch	Low elevation juniper, creosote, scrub oak, serviceberry on rocky, gravelly, and/or sandy calcareous soils in washes and drainages or on hillsides or rocky ledges. 3,400-7,050 ft. Documented from Spring Mountains in Clark County NV and Belted Range and Pahute Mesa in southern Nye County.	N	1	No impact

SPECIES	HABITAT DESCRIPTION and RANGE	KNOWN OR SUSPECTED TO BE PRESENT IN ANALYSIS AREA?	EVALUATION CRITERIA	BIOLOGICAL DETERMINATION
<i>Astragalus robbinsii</i> var. <i>occidentalis</i> Lamoille Canyon milkvetch	Willow, aspen or shrubby cinquefoil communities in moist to seasonally dry sandy loam soils in seeps, riparian strips, stream banks, and high-elevation meadow margins. 6,050-10,000 ft. Endemic to Ruby and east Humboldt Mountains in Elko County.	Y	Not excluded	See detailed analysis below
<i>Astragalus toquimanus</i> Toquima milkvetch	Pinyon-juniper, sagebrush typically on gravelly hillsides with gentle slopes in basic or calcareous soils. 6,480-7,520 ft. NV endemic documented from Nye County.	Y	Not excluded	See detailed analysis below
<i>Astragalus uncialis</i> Currant milkvetch	Desert shrub and sagebrush on knolls, gullied foothills, stony washes, saline flats, gently sloping hillsides, and alluvial fans in calcareous sandy-clay or gravelly alkaline soils. 4,800-6,050 ft. In NV documented from Nye County. Also in UT.	Y	Not excluded	See detailed analysis below
<i>Boechera</i> (=Arabis) <i>bodiensis</i> Bodie Hills rockcress	Pinyon-juniper, mountain sagebrush, subalpine, alpine on dry, open, rocky, high or north-facing slopes or exposed summits of granitic or rhyolitic material. 6,720-9,970 ft. In NV known only from western Mineral County.	N	1	No impact
<i>Boechera</i> (=Arabis) <i>falcatoria</i> Grouse Creek rockcress	Exposed gravelly wind-swept passes with low sagebrush in mountain mahogany, sagebrush, and pinyon-juniper associations. 6,600-9,000 ft. In NV, restricted to Ruby Mountains. Also documented from UT.	Y	Not excluded	See detailed analysis below
<i>Boechera</i> (=Arabis) <i>nevadensis</i> Spring Mountains rockcress	Ledges and talus of limestone cliffs. 9,842-11,159 ft. Endemic to Spring Mountains.	N	1, 2	No impact
<i>Boechera</i> (=Arabis) <i>ophira</i> Ophir rockcress	Mountain sagebrush, subalpine conifer, and alpine zones in loamy soil pockets on exposed talus or scree or in rocky areas on south- to west-facing ridge lines and upper slopes. 9,960 to 10,520 ft. Endemic to Toiyabe Range in Lander and Nye Counties.	Y	2	No impact
<i>Boechera</i> (=Arabis) <i>rectissima</i> var. <i>simulans</i> Washoe tall rockcress	Jeffrey Pine-Sierra Nevada White fir forests on dry, deep, sandy, granitic or andesitic soils on mostly gentle slopes of all aspects, in full or filtered sunlight of thinly littered openings. 6,035-7,335 ft. Endemic to northern Carson Range.	N	1, 2	No impact

SPECIES	HABITAT DESCRIPTION and RANGE	KNOWN OR SUSPECTED TO BE PRESENT IN ANALYSIS AREA?	EVALUATION CRITERIA	BIOLOGICAL DETERMINATION
<i>Boechera</i> (=Arabis) <i>rigidissima</i> var. <i>demota</i> Galena Creek rockcress	Fir, pine, and aspen communities on sandy to rocky soils or outcrops derived from granitic or volcanic materials often in drainage ways, near meadow edges or other moisture accumulating microsites. 7,020-10,020 ft. Endemic to northern Carson Range.	N	1, 2	No impact
<i>Boechera</i> (=Arabis) <i>tiehmii</i> Tiehm rockcress	Alpine boulder and rock fields, soil pockets within talus slopes, and slopes of decomposed granite. Over 9,000 ft. In NV known only from Mt. Rose area in northern Carson Range.	N	1, 2	No impact
<i>Botrychium ascendens</i> Upswept moonwort	Riparian areas, seeps, and springs primarily in open habitats, such as alpine meadows, avalanche meadows, and grassy roadsides. 8,136-11,646. in NV. In NV documented from Spring Mountains on HT. Also occurs at Cooney Lake on Bridgeport RD in CA. Distribution includes AK, CA, MN, MT, OR, WY, Alberta, British Columbia, Newfoundland, Ontario, Quebec, and Yukon Territory.	Y	Not excluded	See detailed analysis below
<i>Botrychium crenulatum</i> Dainty moonwort	Riparian areas, seeps, and springs in very moist sites with saturated soil and dense herbaceous vegetation. 8,136 to 11,154 in NV. In NV documented from Jarbidge and Ruby Mountains RDs and SMNRA on HT. Also in AZ, CA, ID MT, OR, UT, WA, WY, British Columbia, and Alberta.	Y	Not excluded	See detailed analysis below
<i>Botrychium lineare</i> Slender moonwort	Riparian areas, seeps, and springs in a variety of areas ranging from limestone cliffs and gravelly beaches to wet meadows and forest understory. 8,497-9,776 ft. in NV. In NV, documented from Spring Mountains. Also occurs in AK, CA, CO, SD, MT, UT, WA, WY, Yukon Territory, and historically in New Brunswick and Quebec.	Y	Not excluded	See detailed analysis below
<i>Botrychium tunux</i> Moosewort	Riparian areas, seeps, and springs in disjunct areas, including low elevation coastal beaches and dunes in Alaska, well-drained rocky meadows in California, and sparsely vegetated alpine scree slopes in Montana, Wyoming and Colorado. 9,186-9,842 ft. in NV. On HT documented from Spring Mountains and Bridgeport Ranger District.	Y	Not excluded	See detailed analysis below
<i>Carex tiogana</i> Tioga pass sedge	Alpine on terraces next to lakes, meadows, and other mesic sites. 10,100-10,900 ft. Endemic to Sierra Nevada in CA.	N	1, 2	No impact



SPECIES	HABITAT DESCRIPTION and RANGE	KNOWN OR SUSPECTED TO BE PRESENT IN ANALYSIS AREA?	EVALUATION CRITERIA	BIOLOGICAL DETERMINATION
<i>Cusickiella quadricostata</i> Bodie Hills draba	Great Basin scrub, including low sagebrush, grasslands, pinyon-juniper, mountain mahogany, on clay or rocky soils on flats and rolling hills. 6,000-8,500 ft. NV distribution limited to western Douglas, Lyon & Mineral Counties	N	1	No impact
<i>Cymopterus goodrichii</i> Goodrich biscuitroot	Upper subalpine and lower alpine on moderate to steep scree and talus slopes of dark angular slate or limestone. 7,300-11,100 ft. NV endemic documented from Lander, Nye, and Pershing Counties.	Y	2	No impact
<i>Draba arida</i> Arid draba	Subalpine conifer and lower alpine in rock crevices, scree, snow-bank areas, rocky soils, loam, or forest litter on gentle to steep slopes of all aspects. Often with limber pine. 7,350-11,100 ft. NV endemic documented from Lander and Nye Counties.	Y	2	No impact
<i>Draba asterophora</i> var. <i>asterophora</i> Star draba	Subalpine conifer zone on granite rock crevices, talus, scree, rocky decomposed granite, or volcanic soils on steep slopes, mostly on north to east aspects. 8,000-10,200 ft. Endemic to Sierra Nevada.	N	1, 2	No impact
<i>Draba brachystylis</i> Wasatch Draba	Montane coniferous forest and bristlecone pine communities in moist to damp rocky pockets and soils on drainage banks, steep drainage areas, and avalanche chutes where snowdrifts remain until late winter. 7,874-9,022 ft. in NV. In NV, restricted to Spring Mountains. Also in UT.	N	1, 2	No impact
<i>Draba jaegeri</i> Jaeger draba	Subalpine conifer, lower alpine, and occasionally upper montane conifer zones, most often in the understory of bristlecone pine forest on dry carbonate scree, talus, crevices, and coarse rocky soils on ridges and steep north-facing slopes. 8,370-11,650 ft. Endemic to Spring Mountains.	N	1, 2	No impact
<i>Draba oreibata</i> var. <i>serpentina</i> Serpentine draba	Lower alpine and upper subalpine conifer in dry quartzite cliff crevices, and on ledges, talus, and rocky slopes. 10,000-11,926 ft. NV endemic documented from Lander and White Pine Counties.	Y	2	No impact
<i>Draba paucifructa</i> Charleston draba	Alpine and bristlecone pine communities in moist places, on rock ledges, along avalanche chutes, and in seeps. 8,700-11,300 ft. Endemic to Spring Mountains.	N	1, 2	No impact

SPECIES	HABITAT DESCRIPTION and RANGE	KNOWN OR SUSPECTED TO BE PRESENT IN ANALYSIS AREA?	EVALUATION CRITERIA	BIOLOGICAL DETERMINATION
<i>Draba pennellii</i> Pennell draba	Pinyon-juniper, subalpine, and alpine on crevices and ledges of carbonate or quartzite cliffs, outcrop faces, and ridges in the zones. 6,200 to 11,800 ft. Endemic to White Pine County.	Y	3 <sup>3</sup>	No impact
<i>Epilobium nevadense</i> Nevada willowherb	Pinyon pine and ponderosa pine communities on limestone talus slopes and rock outcrops. 6,000-8,930 ft. in NV. Documented from Clark, Eureka, and Lincoln Counties NV. Also in UT.	Y	Not excluded	No impact
<i>Ericameria compacta</i> (= <i>Haplopappus compactus</i> ) Spring Mountain goldenweed	Ponderosa pine, limber pine and bristlecone pine in sheltered areas on sparsely timbered slopes. 2,850-11,350 ft. Endemic to Spring and Sheep Mountains.	N	1, 2	No impact
<i>Erigeron cavernensis</i> Snake Mountain erigeron	Montane conifer and subalpine conifer zones on limestone cliffs, outcrops, crevices, and rubble often in limber pine and bristlecone pine communities. 6,890 to 11,155 ft. NV endemic documented from White Pine County.	Y	2	No impact
<i>Eriogonum douglasii</i> var. <i>elkoense</i> Sunflower Flat buckwheat	Mixed grassland and sagebrush communities on sandy to gravelly flats and slopes. 6,200 to 6,900 ft. Narrow endemic to Sunflower Flat area in northwestern Elko County.	Y	Not excluded	See detailed analysis below
<i>Eriogonum esmeraldense</i> var. <i>toiyabense</i> Toiyabe buckwheat	Pinyon-juniper, mountain sagebrush, mountain mahogany, and subalpine conifer on steep, loose slopes derived from rhyolitic or andesiteic volcanic materials, frequently on white ash deposits. 6,900 -10,500 ft. NV endemic documented from Eureka, Lander, and Nye Counties.	Y	Not excluded	See detailed analysis below
<i>Eriogonum heermannii</i> var. <i>clokeyi</i> Clokey buckwheat	Creosote-bursage, shadcale, and blackbrush on carbonate outcrops, talus, scree, and gravelly washes and banks. 4,000-6,000 ft. Documented only from Spring & Sheep Mtns in Clark County & DOE lands in southern Nye County.	N	1, 2	No impact
<i>Eriogonum lewisii</i> Lewis's buckwheat	Mountain or low sagebrush on dry, exposed, shallow, relatively barren, undisturbed, rocky soils on convex ridge-line knolls and crests underlain by siliceous carbonate rocks, on flat to moderately steep slopes of all aspects. Clay hills at lower elevations. 6,470-9,720 ft. NV endemic documented from Elko and Eureka Counties.	Y	Not excluded	See detailed analysis below

<sup>3</sup> Although Pennell draba occurs within sagebrush and pinyon-juniper vegetation, it occurs in crevices and ledges of carbonate or quartzite cliffs, outcrop faces, and ridges occurs on near vertical limestone cliffs and in talus at base of cliffs, which do not constitute greater sage grouse habitat.

SPECIES	HABITAT DESCRIPTION and RANGE	KNOWN OR SUSPECTED TO BE PRESENT IN ANALYSIS AREA?	EVALUATION CRITERIA	BIOLOGICAL DETERMINATION
<i>Eriogonum robustum</i> Altered andesite buckwheat	Restricted to andesitic soils on barren ridges, knolls and steep slopes. 4,410-7,325 ft. NV narrow endemic documented from Storey County and southwestern Washoe County.	N	1	No impact
<i>Glossopetalon clokeyi</i> Clokey greasebush	Pinyon-juniper, sagebrush, ponderosa pine, white fir, limber pine, and bristlecone pine communities on vertical and near-vertical limestone cliff faces and ledges. 6,594-9678 ft. Endemic to Spring Mountains.	N	1	No impact
<i>Glossopetalon pungens</i> var. <i>glabra</i> (=G.pungens) Smooth dwarf greasebrush	Pinyon-juniper, sagebrush, and montane conifer on vertical crevices of limestone cliff faces and rocky slopes or outcrops. 6,000-7,800 ft. Distribution limited to Clark Mtns CA and Spring & Sheep Mtns NV.	N	1	No impact
<i>Ivesia aperta</i> var. <i>aperta</i> Sierra Valley ivesia	Yellow pine, mountain sagebrush, and mountain mahogany zones on vernaly saturated sites, such as meadow flats and borders and ephemeral channels. NV populations are restricted to shallow, slow draining soils of volcanic origin. 6,460-7,300 ft. in NV. Documented from Carson and Virginia Ranges and Peavine Mtn NV. Also in CA.	N	1	No impact
<i>Ivesia aperta</i> var. <i>canina</i> Dog Valley ivesia	Yellow pine forest on vernaly saturated sites, including meadow flats, borders of gently sloping openings, and ephemeral channels on soils with sandy loam and slightly acidic surface layer. 5,249-6,561 ft. Endemic to Dog Valley, CA.	N	1, 2	No impact
<i>Ivesia cryptocaulis</i> Charleston ivesia	Subalpine bristlecone pine and alpine on moist to dry carbonate scree, talus, outcrops, and gravelly soils on steep slopes, ridges, and alpine flats. 10,890-11,915 ft. Endemic to Spring Mountains.	N	1, 2	No impact
<i>Ivesia jaegeri</i> Jaeger ivesia	Pinyon pine, ponderosa pine, bristlecone pine, mountain mahogany communities on limestone and sandstone cliffs and crevices. 5,200-11,060 ft. in NV. NV distribution limited to Spring Mountains. Also in CA.	N	1, 2	No impact
<i>Ivesia sericoleuca</i> Plumas ivesia	Sagebrush scrub, yellow pine forest, freshwater wetlands, and wetland-riparian communities associated with seasonally wet meadows, meadow ecotones, terraces and toeslopes on primarily volcanic soils. 4,297-7,217 ft. Endemic to California.	N	1	No impact

SPECIES	HABITAT DESCRIPTION and RANGE	KNOWN OR SUSPECTED TO BE PRESENT IN ANALYSIS AREA?	EVALUATION CRITERIA	BIOLOGICAL DETERMINATION
<i>Ivesia webberi</i> Webber ivesia	Low sagebrush in full sun on gentle slopes (<15%) in sparsely vegetated areas. 4,000-5,950 ft. NV distribution limited to Peavine Mtn, Carson Range and Pine Nut Mtns.	N	1	No impact
<i>Jamesia tetrapetala</i> Basin jamesia	Pinyon-juniper to subalpine in cracks and crevices of limestone outcrops and talus at cliff bases. 6,560-10,800 ft. Lincoln, Nye, and White Pine Counties NV. Also in UT.	Y	Not excluded	See detailed analysis below
<i>Lathyrus grimesii</i> Grimes lathyrus	Sagebrush, mountain shrub on dry, open, shallow, silty clay soils usually overlain by a thin scree of reddish to yellowish brown gravel, stone, and clay that form relatively barren patches on mostly steep slopes of all aspects with a sparse to moderately dense vegetation association. 6,000-8,300 ft. Endemic to Elko County, NV.	Y	Not excluded	See detailed analysis below
<i>Lesquerella hitchcockii</i> var. <i>hitchcockii</i> (= <i>Physaria hitchcockii</i> var. <i>hitchcockii</i> ) Hitchcock bladderpod	Pinyon-juniper to the subalpine conifer zones on dry, gravelly, carbonate soils, scree, talus, and outcrops on knolls, flats, and slopes. 7,000-11,710 ft. Documented in NV from Spring and Sheep Mountains. May also include occurrences on Table Cliff Plateau UT.	N	1, 2	No impact
<i>Lewisia maguirei</i> Maguire lewisia	Pinyon-juniper on dry, sparsely vegetated carbonate scree or shallow gravelly-clay soils on steep slopes and ridgelines. 7,360 to 8,280 ft. Endemic to Grant-Quinn Range in Nye County NV.	Y	Not excluded	See detailed analysis below
<i>Meesia triquetra</i> Three-ranked hump-moss	Upper montane coniferous forest and subalpine coniferous forest in bogs, fens, meadows, and seeps. 4,250-9,700 ft. Distribution limited to Sierra Nevada bioregion.	N	1, 2	No impact
<i>Orthotrichum shevockii</i> Shevock rockmoss	Joshua tree woodland, pinyon-juniper woodland, and Jeffrey pine forest on underhangs or in crevices of granitic rock in filtered light. 3,600-5,250 ft. Endemic to Eastern to Central Sierra Nevada and Western edge of Nevada in the Carson Range.	N	1	No impact
<i>Orthotrichum spjutii</i> Spjut's brittle-moss	Lower montane coniferous forest, pinyon and juniper woodland, subalpine coniferous forest, upper montane coniferous forest in shaded areas near stream beds and in canyons on deciduous trees and rarely on shaded rocks. 6,890-8,500 ft. Endemic to CA.	N	1	No impact

SPECIES	HABITAT DESCRIPTION and RANGE	KNOWN OR SUSPECTED TO BE PRESENT IN ANALYSIS AREA?	EVALUATION CRITERIA	BIOLOGICAL DETERMINATION
<i>Penstemon arenarius</i> Dune penstemon	Desert shrub on deep, loose sandy soils of valley bottoms, aeolian deposits, and dune skirts, often in alkaline areas, sometimes on road banks and other recovering disturbances. 3,920-5,960 ft. NV endemic documented from Churchill, Mineral, and Nye Counties.	N	2	No impact
<i>Penstemon concinnus</i> Elegant penstemon	Pinyon-juniper woodlands in gravelly, alluvial soils. 5,925 to 7,700 ft. Lincoln and White Pine Counties NV. Also in UT.	Y	Not excluded	See detailed analysis below
<i>Penstemon leiophyllus</i> var. <i>heckii</i> Charleston beardtongue	Limber pine, bristlecone pine, and aspen in unvegetated gravelly areas or open meadows at or near timberline. 2,980-11,480 ft. Endemic to Spring Mountains.	N	1	No impact
<i>Penstemon moriahensis</i> Mt. Moriah penstemon	Subalpine, mountain mahogany, ponderosa pine, and upper pinyon-juniper on open, gravelly and/or silty carbonate soils in drainages, on gentle slopes, and on road banks or other recovering disturbances with enhanced runoff. 7,100 to 10,800 ft. NV endemic documented from White Pine County.	Y	Not excluded	See detailed analysis below
<i>Penstemon pudicus</i> Bashful penstemon	Mountain sagebrush, mountain mahogany, and pinyon juniper in crevices, soil pockets, and coarse rocky soils of felsic volcanic outcrops, boulder piles, steep protected slopes, and drainage bottoms. 7,500-9,000 ft. NV endemic documented from Nye County.	Y	Not excluded	See detailed analysis below
<i>Penstemon rhizomatosus</i> Rhizome beardtongue	Subalpine conifer in crevices of cliffs and outcrops, or silty loam soil pockets in talus or scree of carbonate rocks on steep slopes. 10,000-11,250 ft. Narrow endemic within White Pine County.	Y	2	No impact
<i>Penstemon rubicundus</i> Wassuk beardtongue	Desert scrub, sagebrush, pinyon-juniper on open, rocky to gravelly soils on perched tufa shores, steep decomposed granite slopes, rocky drainage bottoms, and recovering disturbances with enhanced runoff. 4,200-6,850 ft. NV endemic with distribution limited to Douglas, Mineral and Esmeralda Counties.	N	1	No impact
<i>Penstemon thompsoniae</i> ssp. <i>jaegeri</i> Jaeger beardtongue	Pinyon-juniper to the subalpine conifer zones on gravelly limestone banks, hillsides, knolls, or slopes, in drainages, and under conifers. 5,577-11,060 ft. Endemic to Spring and Sheep Mountains.	N	1	No impact

SPECIES	HABITAT DESCRIPTION and RANGE	KNOWN OR SUSPECTED TO BE PRESENT IN ANALYSIS AREA?	EVALUATION CRITERIA	BIOLOGICAL DETERMINATION
<i>Phacelia inconspicua</i> Inconspicuous phacelia	Mountain big sagebrush in small clearings on deep, undisturbed soils with high organic content on steep concave north to northeast facing slopes where moisture and snow accumulate. 5,000-8,280 ft. in NV. In NV known only from northern Humboldt Range, Pershing County. Also in ID.	Y	Not excluded	See detailed analysis below
<i>Phacelia minutissima</i> Small-flower phacelia	Riparian areas in vernaly saturated, summer-drying, sparsely vegetated, partially shaded to fully exposed areas of bare soil and mud banks in meadows, at perimeters of corn lily, mule-ears, and/or aspen, and on ephemeral stream banks. 6,240-8,900 ft. in NV. Elko and Eureka Counties NV. Also in ID and WA.	Y	Not excluded	See detailed analysis below.
<i>Phacelia monoensis</i> Mono phacelia	Pinyon-juniper, low sagebrush, and mountain sagebrush on alkaline, barren or sparsely vegetated shrink-swell clays. 6,000-9,000 ft. NV distribution limited to Esmeralda, Lyon and Mineral Counties.	N	1	No impact
Whitebark pine <i>Pinus albicaulis</i>	Subalpine on dry, rocky sites, ledges, and cliff faces often with white pine, limber pine, lodgepole pine, subalpine fir. 6,800-10,750 in NV.	Y	2	No impact
<i>Plagiobothrys glomeratus</i> Altered andesite popcorn flower	Sagebrush, pinyon-juniper, and montane conifer zones. Restricted to altered andesite soils. 4,860-6,650 ft. Western NV endemic documented from Storey and southwestern Washoe Counties.	N	1	No impact
<i>Poa abbreviata</i> ssp. <i>marshii</i> Marsh's bluegrass	Alpine in soil pocks in scree, talus, boulder, rock fields, and loose quartzite. 11,600-12,600 ft. Documented from White Pine County NV. Also in CA and ID.	Y	2	No impact
<i>Polemonium chartaceum</i> White Mountain skypilot	Alpine boulder and rock fields and subalpine coniferous forest on rocky, serpentine, granitic, or volcanic soils. 5,900-13,700 ft. In NV documented only from White Mountains.	N	1, 2	No impact
<i>Polyctenium williamsiae</i> Williams combleaf	Pinyon-juniper and sagebrush on relatively barren sandy to sandy-clay or mud margins and bottoms of non-alkaline seasonal lakes perched over volcanic bedrock. 5,670-8,930 ft. Documented from Douglas, Lyon, Mineral, Nye, and Washoe Counties NV. Also in CA and OR.	Y	Not excluded	See detailed analysis below
<i>Potentilla johnstonii</i> Sagebrush cinquefoil	Pinyon-juniper and sagebrush. 7,600 ft. Endemic to Quinn Canyon Range in Nye County.	Y	Not excluded	See detailed analysis below

SPECIES	HABITAT DESCRIPTION and RANGE	KNOWN OR SUSPECTED TO BE PRESENT IN ANALYSIS AREA?	EVALUATION CRITERIA	BIOLOGICAL DETERMINATION
<i>Primula capillaris</i> Ruby Mountain primrose	Subalpine meadow openings in the subalpine conifer zone on moist, seasonally saturated, slowly creeping, dark brown loam or sandy loam soils derived from glacial till, generally on steep north to northeast aspects. 8,500-10,000 ft. Endemic to the Ruby Mountains.	N	2	No impact
<i>Primula cusickiana</i> var. <i>nevadensis</i> (= <i>P. nevadensis</i> ) Nevada primrose	Subalpine conifer and lower alpine zones in limestone rock outcrops, crevices, talus, scree, and gravelly soils or soil pockets often on north to east aspects or in lee ward snow-accumulation areas sometimes in litter of bristlecone pine, meadows, or riparian areas. 10,200-11,590 ft. NV endemic documented from Nye and White Pine Counties.	Y	2	No impact
<i>Senecio pattersonensis</i> Mono ragwort	Alpine on talus slopes and gravelly ridges at and above timberline and in alpine fell-fields. 9,500-12,200 ft. Endemic to CA.	N	1, 2	No impact
<i>Silene clokeyi</i> Clokey silene	Dry to moist carbonate scree, talus, and loose rocky soils on ridges, flats, and steep slopes. 9,940-11,580 ft. Endemic to Spring Mountains.	N	1, 2	No impact
<i>Silene nachlingerae</i> Nachlinger silene	Subalpine conifer on rocky limestone knolls and ridges or at the bases of steep slopes or cliffs. 7,160-11,250 ft. NV endemic documented from Elko, Nye, and White Pine Counties NV.	Y	2	No impact
<i>Sphaeralcea caespitosa</i> var. <i>williamsiae</i> Railroad Valley globemallow	Desert shrub and sagebrush restricted to sevy dolomite calcareous soil. 4,770 to 5,310. Nye County NV. Also in UT.	Y	Not excluded	See detailed analysis below
<i>Sphaeromeria compacta</i> Low sphaeromeria	Lower alpine and upper subalpine conifer zones along ridges and slopes on carbonate scree, talus, outcrops, and rocky fellfields. 9,680-11,810 ft. Endemic to Spring Mountains.	N	1, 2	No impact
<i>Streptanthus oliganthus</i> Masonic Mountain jewelflower	Pinyon-juniper, sagebrush-grass, and Jeffery pine zones on rocky slopes or talus, on flat areas, in ravines, and in canyon bottoms in sandy or gravelly soil of decayed granite or decomposing volcanic rock. 6,400-10,000 ft. NV distribution limited to Esmeralda, Lyon and Mineral Counties. Also in CA.	N	1	No impact
<i>Synthyris ranunculina</i> Charleston kittentails	Bristlecone pine and limber pine along moist cliff bands bordering avalanche chutes and drainages. 8,760-12,073 ft. Endemic to Spring Mountains.	N	1, 2	No impact

SPECIES	HABITAT DESCRIPTION and RANGE	KNOWN OR SUSPECTED TO BE PRESENT IN ANALYSIS AREA?	EVALUATION CRITERIA	BIOLOGICAL DETERMINATION
<i>Tonestus</i> (=Haplopappus) <i>alpinus</i> Alpine goldenweed	Mountain mahogany, subalpine conifer, and lower alpine in crevices, rubble, and adjacent rocky soils of rock outcrops, often on northerly or protected aspects. 8,900-11,810 ft. NV endemic documented from Lander and Nye Counties.	Y	2	No impact
<i>Townsendia jonesii</i> var. <i>tumulosa</i> Charleston ground daisy	From upper shadscale/mixed shrub to lower subalpine conifer zones on ridges, slopes, saddles, and washes in open places away from shrubs. 5,200-11,060 ft. Documented from Spring and Sheep Mountains in Clark County and Sunnyside in Nye County.	Y	Not excluded	See detailed analysis below
<i>Trifolium andinum</i> var. <i>podocephalum</i> Currant Summit clover	Pinyon-juniper zone in crevices of volcanic or limestone rock. 6,900-7,400 ft. Endemic to White Pine and Egan Ranges in Lincoln and Nye Counties.	Y	Not excluded	See detailed analysis below
<i>Trifolium leibergii</i> Leiberg's clover	Sagebrush to pinyon-juniper mainly on dry, shallow, relatively barren gravel soils of crumbling volcanic outcrops, bare shale crests, talus slopes, and reddish ash flow tuft. 6,560 to 7,800 ft. in NV. In NV documented from Elko County. Also in OR.	Y	Not excluded	See detailed analysis below
<i>Trifolium macilentum</i> var. <i>rollinsii</i> Rollins clover	Mountain sagebrush, subalpine conifer, and lower alpine on dry to moist gravelly soils in concave, leeward, or otherwise moisture-accumulating areas on steep to moderate slopes. 8,800 to 10,580 ft. Endemic to Toiyabe Range, NV.	Y	Not excluded	See detailed analysis below
<i>Viola charlestonensis</i> Charleston violet	Pinyon pine, Utah juniper, ponderosa pine and aspen on limestone hills, slopes, and dry washes. 6,500-9,800 ft. In NV known only from Spring Mountains. Also in AZ & UT.	N	1	No impact
<i>Viola lithion</i> Lithion violet	Subalpine to alpine zone in seasonally wet crevices and along narrow ledges of steep carbonate or quartzite outcrops in shaded northeast-facing avalanche chutes and cirque headwalls. 7,840-10,480 ft. in NV. Elko, Nye and White Pine Counties NV. Also in UT.	N	2	No impact



Table 3. Species analyzed in detail because they may be affected by one of the action alternatives.

Species	Habitat affinity	Species Group
<b>Mammals</b>		
Bighorn sheep <i>Ovis canadensis</i>	GRA, SHR, S	Sagebrush-associated species
Pygmy rabbit <i>Brachylagus idahoensis</i>	S	Sagebrush-associated species
Columbia spotted bat <i>Euderma maculatum</i>	PJ, RIP, S	Sagebrush-associated species
Townsend's western big-eared bat <i>Corynorhinus townsendii</i>	GRA, PP, RIP, S	Sagebrush-associated species
<b>Birds</b>		
Greater Sage-Grouse <i>Centrocercus urophasianus</i>	GRA,MS, PJ, PP, SHR, S	Sagebrush-associated species
<b>Plants</b>		
<i>Antennaria arcuata</i> Meadow pussytoes	M & SP in S & GRA	Plants
<i>Asclepias eastwoodiana</i> Eastwood milkweed	DS, S, PJ	Plants
<i>Astragalus lentiginosus</i> var. <i>latus</i> Broad-pod freckled milkvetch	PJ	Plants
<i>Astragalus robbinsii</i> var. <i>occidentalis</i> Lamoille Canyon milkvetch	RIP, M	Plants
<i>Astragalus toquimanus</i> Toquima milkvetch	PJ, S	Plants
<i>Astragalus uncialis</i> Currant milkvetch	DS, S	Plants
<i>Boechera falcatoria</i> Grouse Creek rockcress	S, MM	Plants
<i>Botrychium ascendens</i> Upswept moonwort	RIP, SP,M	Plants
<i>Botrychium crenulatum</i> Dainty moonwort	RIP, SP	Plants
<i>Botrychium lineare</i> Slender moonwort	RIP, SP, M	Plants

Species	Habitat affinity	Species Group
<i>Botrychium tunux</i> Moosewort	RIP, SP, M	Plants
<i>Epilobium nevadense</i> Nevada willowherb	PP, PN	Plants
<i>Eriogonum douglasii</i> var. <i>elkoense</i> Sunflower flat buckwheat	GRA, S	Plants
<i>Eriogonum esmeraldense</i> var. <i>toiyabense</i> Toiyabe buckwheat	PJ, S, MM, C	Plants
<i>Eriogonum lewisii</i> Lewis's buckwheat	S	Plants
<i>Jamesia tetrapetala</i> Basin jamesia	PJ & SA	Plants
<i>Lathyrus grimesii</i> Grimes lathyrus	S, MS	Plants
<i>Lewisia maguirei</i> Maguire lewisia	PJ	Plants
<i>Penstemon concinnus</i> Elegant penstemon	PJ	Plants
<i>Penstemon moriahensis</i> Mt. Moriah penstemon	SA, MM, PP, PJ	Plants
<i>Penstemon pudicus</i> Bashful penstemon	S, MM, PJ	Plants
<i>Phacelia inconspicua</i> Inconspicuous phacelia	S	Plants
<i>Phacelia minutissima</i> Small-flower phacelia	RIP	Plants
<i>Polyctenium williamsiae</i> Williams combleaf	PJ, S	Plants
<i>Potentilla johnstonii</i> Sagebrush cinquefoil	PJ, S	Plants
<i>Sphaeralcea caespitosa</i> var. <i>williamsiae</i> Railroad Valley globemallow	DS, S	Plants
<i>Townsendia jonesii</i> var. <i>tumulosa</i> Charleston ground daisy	SHR, C	Plants

Species	Habitat affinity	Species Group
<i>Trifolium andinum</i> var. <i>podocephalum</i> Currant Summit clover	PJ	Plants
<i>Trifolium leibergii</i> Leiberg's clover	S, PJ	Plants
<i>Trifolium macilentum</i> var. <i>rollinsii</i> Rollins clover	S, C, A	Plants
<b>Key:</b> A = Alpine; C = Coniferous forest; DS = Desert shrub; GRA = Grassland; M = Meadows (wet or dry), fens; MM = Mountain mahogany; MS = Mountain shrub; PJ = Pinyon-Juniper; PN = Pinyon pine; PP = Ponderosa pine; RIP = Riparian; SHR = Shrubland; S = Sagebrush; SA = Subalpine; SP = Seeps, springs, swales		

## VII. SPECIES INFORMATION AND EFFECTS ANALYSIS (Direct, Indirect and Cumulative)

### A. Greater Sage-Grouse (*Centrocercus urophasianus*)

#### Life History

Sage-grouse depend on a variety of semiarid shrub-grassland (shrub steppe) habitats throughout their life cycle, and are considered obligate users of sagebrush (e.g., *Artemisia tridentata* ssp. *wyomingensis* (Wyoming big sagebrush), *A. t.* ssp. *vaseyana* (mountain big sagebrush), and *A. t. tridentata* (basin big sagebrush)) (Patterson 1952; Braun et al. 1976; Connelly et al. 2000; Connelly et al. 2004; Miller et al. 2011). Sage-grouse also use other sagebrush species (which can be locally important) such as *A. arbuscula* (low sagebrush), *A. nova* (black sagebrush), *A. frigida* (fringed sagebrush), and *A. cana* (silver sagebrush) (Schroeder et al. 1999; Connelly et al. 2004). Sage-grouse distribution is strongly correlated with the distribution of sagebrush habitats (Schroeder et al. 2004; Connelly et al. 2011b). Sage-grouse exhibit strong site fidelity (loyalty to a particular area) to seasonal habitats (i.e., breeding, nesting, brood rearing, and wintering areas) (Connelly et al. 2004; Connelly et al. 2011a). Adult sage-grouse rarely switch from these habitats once they have been selected, limiting their ability to respond to changes in their local environments (Schroeder et al. 1999). (Life history section was copied from the USFWS FINAL COT report – Feb. 2013).

Based on GIS analysis of the EIS planning area, the following table describes the number of acres of GRSG PPH and PGH on the Humboldt-Toiyabe National Forest and the percentage of the Forest considered occupied habitat.

<b>FORESTNAME</b>	<b>Forest Acres</b>	<b>PPH</b>	<b>PGH</b>	<b>Total Occupied</b>	<b>% of Forest</b>
Humboldt-Toiyabe	4,661,100	1,183,600	539,900	1,723,500	37%

*\* NV acres had to be rounded to nearest 100 acres due to boundary sliver polygons between FS boundaries (developed for SG EIS) and EDW District data boundaries.*

Habitat conditions and population information were largely taken from the USFWS FINAL COT report – Feb. 2013.

### **Habitat and Population Condition**

The Humboldt-Toiyabe (H-T) National Forests are unique in that there are 7 ranger districts that contain sage-grouse habitat that are spread out over a very large area in the central and southern portion of the Great Basin in Nevada. All of the ranger districts that comprise the H-T are found within two grouse populations: Great Basin core and Quinn Canyon.

The Nevada portion of this population contains the largest number of sage-grouse in this population delineation. Suitable habitats are somewhat uncharacteristic of sage-grouse habitats because use areas are disjunct, but connected. This is due to the “basin and range” topography that is characteristic of this region. Lower elevation valley bottoms often are dominated by playas and salt desert shrub vegetation, but transcend quickly into sagebrush dominated benches, which often comprises the breeding and winter habitat. Moving up in elevation, pinyon-juniper woodlands dominate the mid-elevation and gives way to little sagebrush, mountain big sagebrush and mountain shrub communities used by sage-grouse as nesting and brood rearing habitat in the higher elevations (> 2,200 m). There are a total of 1,183,600 acres of PPH and 539,900 acres of PGH on the H-T.

The effects analysis on Greater Sage-Grouse for the EIS relies heavily on a metric derived from buffering lek locations (Doherty et al. 2011) as a proxy to spatially delineate nesting habitat, and provides a quantitative measure of the percentage of the population potentially impacted within the planning area (see EIS Ch. 4 Greater Sage-Grouse section). Using this methodology, management decisions on the H-T have the potential to impact 23% of the GRSG population within the planning area based on a weighted model of leks on or within 4 miles of Forest Service lands.

This population metric is correlated to nesting habitat and is derived by assigning to individual leks their contribution to Greater Sage-Grouse populations at the population/subpopulation scale (see Section 3.2.1 and Section 4.3.1) and at the sub-region scale. The metric provides for inferences toward population effects from each resource allocation expressed as a percentage of population at the two scales. The analysis conducted in the EIS regarding this population metric was done on BLM and FS lands. When looking only at FS lands, the pattern of the percentage of

the population potentially impacted under each alternative is consistent with the EIS analysis, however, it is smaller since there is less habitat on FS lands.

Garton et al. (2011) determined that the population has declined by 19 percent from the period 1965-69 through 2000-2007 and that average rates of population change were  $<1.0$  for three of the eight analysis periods from 1965-2007. In addition, Garton et al. (2011) determined that this population has a two percent chance of declining below 200 males within the next 30 years and a 78 percent chance of declining below 200 males within 100 years (by 2107).

The Quinn Canyon population is a very small and isolated population located in southeastern Nevada. There were not enough data for Garton et al. (2011) to conduct an analysis on population trends or persistence. Two to three leks have been identified in this area, but there is very little information associated with these sites and most of this information is anecdotal. Habitat within this area has been compromised by pinyon-juniper encroachment. Very little sagebrush exists within this population. Overall this is a high risk population.

### Threats

Threats to sage-grouse on and around the Humboldt-Toiyabe NF include, but are not limited to fragmentation and loss of habitat, primarily from fire, wind and solar energy development, grazing, and recreation. In addition some of the historic habitat available to sage-grouse within this population has transitioned to pinyon-juniper woodlands. Miller and Tausch (2001) estimated that the area of pinyon-juniper woodlands has increased approximately 10-fold throughout the western United States since the late 1800s. Additionally, Wisdom et al. (2005) determined that 35 percent of the sagebrush area in the eastern Great Basin is at high risk to future displacement by pinyon-juniper woodlands and that mountain big sagebrush appeared to be most at risk, which could have meaningful impacts to sage-grouse brood rearing habitats within the upper elevations of mountain ranges within this region. In addition to this threat, much of the Great Basin is also susceptible to sagebrush displacement by cheatgrass. The most at risk vegetative community in this region is Wyoming basin big sagebrush (Wisdom et al. 2005) located predominately within the lower elevation benches of mountain ranges. In some areas, this condition has already been realized and the future risk for existing sagebrush habitats is moderate to high. This threatens both breeding and winter habitats for sage-grouse. For example, in a study conducted within this region (in Eureka County, NV), Blomberg et al. (2012) determined that sage-grouse leks that were not impacted by exotic grasslands experienced recruitment levels that were six times greater than those impacted by exotic grasslands. Additionally, this study found that drought is a major contributor to reduced recruitment and low population growth within the Southern Great Basin. Other threats such as mining and infrastructure have the potential to affect this sage-grouse population due to mine expansions, as well as new mines and the infrastructure associated with them. Existing mining claims are virtually ubiquitous throughout the Southern Great Basin PAC. Overall, sage-grouse in the Southern Great Basin in Nevada are potentially at-risk.

## Alternative A - No Action

### Vegetation and Soils

#### *Direct and Indirect Effects*

In parts of the sub-region, invasive species such as cheatgrass or native species such as pinyon or juniper have replaced desirable dominant species. Invasive plants are thought to alter plant community structure and composition, productivity, nutrient cycling, and hydrology, and may competitively exclude native plant populations. Cheatgrass competes with native grasses and forbs that are important components of Greater Sage-Grouse (GRSG) habitat. Invasive species cause direct degradation of sagebrush habitats resulting in effects on local GRSG populations by affecting forage, cover quality and composition, increased wildfire frequency and intensity (see Fire and Fuels discussion below), with the potential to cause complete avoidance. As discussed below in Fire and Fuels, the encroachment of pinyon and juniper from higher elevations into sagebrush habitats can have a negative impact on GRSG habitat. Expansion of conifer woodlands also threatens GRSG populations because they do not provide suitable habitat and trees displace shrubs, grasses and forbs, required for GRSG through competition for resources. Juniper expansion is also associated with increased bare ground and the potential for erosion, as well as an increase in perch sites for raptors and raptor predation threats.

To reduce the likelihood of invasive weed spread and the extent of current infestations, integrated weed management techniques, including mechanical, manual, chemical, and biological control are utilized. Implementation of the above policies and plans would improve vegetation management by decreasing invasive species, provide for native vegetation establishment in sagebrush habitat, reduce the risk of wildfire, and restore fire-adapted ecosystems and repair lands damaged by fire. Mechanical juniper and pinyon pine treatments would result in short-term disturbances of soils and sagebrush due to heavy equipment, skid trails and temporary roads. Mechanical and manual treatments would also increase noise, vehicular traffic and human presence. However, once the site potential is restored there would be an increase in forage, cover quality and composition, reduction in predator perches, decrease in fire spread and intensity and a potential increase in water availability.

#### *Cumulative Effects*

The baseline date for the cumulative impacts analysis for Greater Sage-Grouse is 2012. The temporal scope of this analysis is a 20-year planning horizon; land use planning documents are generally evaluated on a 5-year cycle. The temporal boundary for cumulative effects analysis for Greater Sage-Grouse includes Western Association of Fish and Wildlife Agencies (WAFWA) Management Zones III (Southern Great Basin), IV (Snake River Plain), and V (Northern Great Basin) which comprise Greater Sage-Grouse habitat in the state of Nevada.

Under Alternative A, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), current vegetation and soils management treatments, including mechanical, manual, chemical, and biological control of invasive plants and pinyon and juniper, would continue and the short-

term negative impacts of these activities on GRSG and GRSG habitats would continue to be outweighed by the long-term beneficial impacts, including increased forage, cover quality and composition, reduced predator perches, decreased fire spread and intensity and potentially increased water availability. Therefore, the direct and indirect effects of vegetation and soils management to Greater Sage-Grouse in Management Zones III, IV and V from the management actions under Alternative A, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to Greater Sage-Grouse.

## **Livestock Grazing**

### ***Direct and Indirect Effects***

Livestock grazing can affect soils, vegetation, water and nutrient availability by consuming or altering vegetation, redistributing nutrients and plant seeds, trampling soils and vegetation, and disrupting microbial composition (Connelly et al. 2004, ch.7). At unsustainable levels of grazing, negative impacts to GRSG can include loss of vegetative cover, reduced water infiltration rates, decreased plant litter, increased bare ground, reduced nutrient cycling, decreased water quality, increased soil erosion, and reduced overall habitat quality for wildlife, including GRSG. Properly managed grazing, however, may protect GRSG habitat by reducing fuel loads. Structural range improvements such as fences represent potential movement barriers (especially woven-wire fences), predator perches or travel corridors, and are a potential cause of direct mortality to GRSG.

Under Alternative A, livestock grazing would continue to be managed through existing grazing plans, with methods and guidelines from the existing plans followed to maintain ecological conditions according to Standards for Rangeland Health, which include maintaining healthy, productive and diverse populations of native plants and animals. Riparian habitats would be managed to achieve standards. Range improvements would be designed to meet both wildlife and range objectives, and would include building or modifying fences to permit passage of wildlife and reduce the chance of bird strikes, use of off-site water facilities, and in some cases modification or removal or improvements not meeting resource needs. Modifications may involve moving troughs, adding or changing wildlife escape ramps, or ensuring water is available on the ground for a various different wildlife species. Although not directly created to protect GRSG, these approaches would protect and enhance GRSG habitat by reducing the likelihood of surface disturbance in sensitive areas and ensuring brood rearing habitat is available to GRSG.

### ***Cumulative Effects***

Although livestock grazing occurs throughout all management zones, in the DEIS it is only considered a “lesser threat” with respect to “relative cumulative actions” and only for Management Zone V (see Chapter 5 of the DEIS). In addition, portions of Management Zone III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and

Territories which have the potential to compound the effects of livestock grazing on these lands; Forest Service-administered lands within Management zones IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); see Chapter 5 of the DEIS].

Under Alternative A, within Management Zones III, IV and V, livestock grazing would continue to be managed through existing grazing plans, with methods and guidelines from the existing plans followed to maintain ecological conditions according to Standards for Rangeland Health, which include maintaining healthy, productive and diverse populations of native plants and animals. Wild horses and burro Territories would be managed for Appropriate Management Level (refer to Wild Horse and Burro Management section below) and healthy populations of wild horse and burros to achieve a thriving natural ecological balance with respect to wildlife, livestock use, and other multiple uses. Therefore, the direct and indirect effects of livestock grazing and wild horse and burro management to Greater Sage-Grouse in Management Zones III, IV and V from the management actions under Alternative A, which would be largely neutral for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to Greater Sage-Grouse.

## **Fire and Fuels**

### ***Direct and Indirect Effects***

Fire is particularly problematic in sagebrush systems because it kills sagebrush plants and, in some cases, re-burns before sagebrush has a chance to re-establish. Fire is a primary threat to GRSG populations where increasing exotic annual grasses, primarily cheatgrass, are resulting in sagebrush loss and degradation. Without fire, cheatgrass dominance can exclude sagebrush seedlings from establishing. With fire, areas can be converted to annual grasslands. Without shrubs and a diversity of grasses and forbs, such annual grasslands will not support GRSG and populations could be displaced. In degraded GRSG habitats where cheatgrass is dominant under the sagebrush canopy, the habitat may be adequate winter habitat or provide adequate cover for nesting. However, these areas may lack the understory forb diversity and insect abundance necessary for brood-rearing and could result in lower chick survival. As GRSG habitats become smaller and less connected to adjacent GRSG populations, they become increasingly susceptible to stochastic events, local extirpation and genetically isolation that can cause inbreeding depression.

Another factor affecting fire in some sagebrush sites is the encroachment of pinyon and juniper trees from higher elevations into sagebrush habitats. Under suitable conditions, wildfires that start in pinyon and juniper stands can move into Wyoming big sagebrush stands. In the absence of cheatgrass, Wyoming sagebrush sites can take 150 years to recover. Where cheatgrass is present, fire can open the site to invasion of annual grasses described above.

The cheatgrass fire cycle causes GRSG habitat loss and degradation on an annual basis. Currently, due to the extent of the threat, there are no management actions that can effectively



alter this trend. Facilitation of the spread of cheatgrass and the likelihood of ignition through BLM and Forest Service-authorized programs is further discussed in the Lands and Realty Management, Energy and Locatable Minerals Development and Travel, Transportation and Recreation sections.

Alternative A would continue to manage fire suppression and fuels management under current direction. Policies would not prioritize protection or restoration of mature sagebrush habitat. Under Alternative A, wildfires would likely continue to increase in size and frequency in Greater Sage-Grouse habitats and those habitats would subsequently continue to be degraded or lost. Small and heavily disturbed populations with dominance of invasive annual grass understory would be particularly susceptible to these impacts. Additionally, there may be some direct and indirect effects to individual Greater Sage-Grouse from direct mortality or disturbance due to fire suppression or fuels treatment activities. Increased human activity and noise associated with wildland fire suppression or fuels treatments in areas occupied by sage-grouse can disrupt nesting, breeding, or foraging behavior. Important habitats can be removed or degraded because of the use of heavy equipment or hand tools. Other potential impacts may include injuring or killing eggs/chicks, or causing changes in species movement patterns due to areas devoid of vegetation.

### ***Cumulative Effects***

Current wildfire suppression operations and fuels management activities would continue under Alternative A. The limitation or prohibition of the use of prescribed fire in sagebrush habitats and the sagebrush protection emphasis during wildland fire operations would not be instituted as they would be in Alternatives B, C, D, E and F. Under Alternative A, the direct and indirect effects, in conjunction with the past, present and reasonably foreseeable future actions and the likelihood of increasing future fires from annual weed invasions and predicted climate change, may result in the increased loss and fragmentation of the existing sagebrush habitat from wildfire in Management Zones III, IV and V (refer to Chapter 5 of the DEIS).

### **Wild Horse and Burro Management**

#### ***Direct and Indirect Effects***

While not as widespread as livestock grazing, wild horse and burro management is still a major land use across the sagebrush biome. Equid grazing results in a reduction of shrub cover and more fragmented shrub canopies, which can negatively affect GRSG habitat (Beever and Aldridge 2011). Additionally, sites grazed by free-roaming equids have a greater abundance of annual invasive grasses, reduced native plant diversity and reduced grass density (Beever and Aldridge 2011). Effects of wild equids on habitats may also be more pronounced during periods of drought or vegetation stress (NTT 2011, pg 18).

Fences associated with wild horse and burro management represent potential movement barriers, predator perches or travel corridors, and are a potential cause of direct mortality to GRSG. In addition to the impacts of fencing on GRSG, The Wild and Free-Roaming Horses and Burros

Act of 1971 requires that water must also be available yearlong in horse management areas. This often leads to riparian areas receiving yearlong use by horses or riparian areas being modified with additional fencing and troughs in order to accommodate yearlong horse use. The range improvements would result in increased potential perch sites, less water available on the ground, and possibly have negative effects to riparian habitat depending on how each facility is constructed. According to Berger (1986), one measure of habitat quality for horses is the presence of meadows. Horse bands that spent more time foraging in meadows had higher reproductive success and meadows received the highest use in proportion to their availability. At levels higher than Appropriate Management Level (AML), impacts can lead to loss of vegetative cover, decreased water quality, increased soil erosion, and reduced overall habitat quality for wildlife, including Greater Sage-Grouse.

Within the Sub-region, all Forest Service districts manage for wild horses and/or burros within established Territories. Under current direction, overall direction is to manage for healthy populations of wild horse and burros to achieve a thriving natural ecological balance with respect to wildlife, livestock use, and other multiple uses. All Forest Service Territories are managed for AML. Initially, AML is established in LUPs at the outset of planning and is adjusted based on monitoring data throughout the life of the plan. Priorities for gathering horses to maintain AML are based on population inventories, gather schedules, and budget. Gathers are also conducted in emergency situations when the health of the population is at risk for lack of forage or water. Direction for prioritizing horse gathers and maintaining AML is not based on GRSG habitat needs, although this is implicit in the Congressional directive to maintain a thriving natural ecological balance. Under Alternative A, there are no GRSG goals, objectives, or management actions specifically identified within the management framework for the Wild Horse and Burro program.

### *Cumulative Effects*

Portions of Management Zone III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories. Forest Service-administered lands within Management zones IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); see Chapter 5 of the DEIS]. Although livestock grazing occurs throughout all management zones, and has the potential to compound the effects of wild horse and burro management on these lands, in the DEIS it is only considered a “lesser threat” with respect to “relative cumulative actions” and only for Management Zone V (see Chapter 5 of the DEIS).

Under Alternative A, within Management Zone III, wild horse and burro Territories would be managed for Appropriate Management Level (refer to Wild Horse and Burro Management section below) and healthy populations of wild horse and burros to achieve a thriving natural ecological balance with respect to wildlife, livestock use, and other multiple uses. Within Management Zones III, IV and V, livestock grazing would continue to be managed through existing grazing plans, with methods and guidelines from the existing plans followed to maintain

ecological conditions according to Standards for Rangeland Health, which include maintaining healthy, productive and diverse populations of native plants and animals. Therefore, the direct and indirect effects of wild horse and burro management and livestock grazing to Greater Sage-Grouse in Management Zones III, IV and V from the management actions under Alternative A, which would be largely neutral for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to Greater Sage-Grouse.

## **Energy and Locatable Minerals Development**

### ***Direct and Indirect Effects***

Minerals development within the sub-region consists of locatable mineral resources at various scales. Mining is primarily for gold, silver, and copper and is largely absent from the basalt-capped areas of northwestern Nevada. Leasable minerals include mineral material sales such as sand and gravel for road maintenance, and limited additional commodities such as potash. Oil and gas is in limited production occurring only in the far southeastern sub-region. Oil and gas leasing occurs over a much larger footprint in western Nevada and additional production is projected as new technologies expand recovery potential. Development of locatable and leasable mineral resources typically requires significant infrastructure and human activity for construction, operation, and maintenance.

Within the sub-region, most public lands are open to oil and gas leasing, saleable mineral material development, and solar development, although specific closures of areas to leasing such as Areas of Critical Environmental Concern (ACECs) or crucial or essential wildlife habitat exist throughout the sub-region. Lands within the sub-region are generally open to mineral location. There are specific locatable mineral withdrawals for particular rights of way, designated wilderness areas, areas of critical environmental concern and other administrative needs, none specific to protecting Greater Sage-Grouse habitat. All locatable mineral activities are managed under the regulations at 43 CFR 3800 through approval of a Plan of Operations. Mitigation of effects to GRSG and its habitat are identified through the NEPA process approving plans of operation. Goals and objectives for locatable minerals are to provide opportunities to develop the resource while preventing undue or unnecessary degradation of public lands. Within the sub-region, most areas of public land would remain open for wind development.

Under Alternative A, all energy and locatable minerals development and associated infrastructure, including power lines, roads, buildings, fences, wind turbines, solar panels, and others, would continue to be managed under current direction. As such, this alternative would be expected to cause the greatest amount of direct and indirect impacts on GRSG and their habitat including habitat loss, degradation, and fragmentation by roads, pipelines and power lines, higher levels of noise, increased presence of roads/humans, and a larger number of anthropogenic structures in an otherwise open landscape that could result in abandonment of leks, decreased attendance at the leks that do persist, lower nest initiation, poor nest success, decreased yearling

survival, and avoidance of energy infrastructure and ancillary facilities in important wintering habitat. Please also refer to the Land Uses and Realty Management section below.

### ***Cumulative Effects***

Energy development is currently a minor threat present only in Management Zone III but geothermal energy development potential is high throughout Management Zone IV (refer to Chapter 5 of the DEIS). Mining is common across Management Zones III and IV in Nevada and occurs at a variety of scales. Management under Alternative A would maintain the current acreage open to leasing of fluid minerals, without stipulations, and locatable mineral development, although areas closed to these activities under Alternative A include some existing ACEC designations, designated wilderness, and wilderness study areas. Current energy and minerals development activities would continue under Alternative A. The closure of areas to fluid minerals and other energy development and withdrawal of areas from mineral entry would not be instituted as they would be in Alternatives B, C, D and F. Therefore, under Alternative A, the direct and indirect effects of energy and locatable minerals development, in conjunction with the past, present and reasonably foreseeable future actions, may result in the increased loss and fragmentation of the existing sagebrush habitat from energy and locatable minerals development in Management Zones III, IV or V (refer to Chapter 5 of the DEIS).

## **Land Uses and Realty Management**

### ***Direct and Indirect Effects***

Under Alternative A, land tenure adjustments would be subject to current disposal/exchange/acquisition criteria, which include retaining lands with threatened or endangered species, high quality riparian habitat, or plant and animal populations or natural communities of high interest. Although land tenure adjustments or withdrawals made in GRSG habitat could reduce the habitat available to sustain GRSG populations, unless provisions were made to ensure that GRSG conservation remained a priority under the new land management regime, land tenure adjustments would likely include retention of areas with GRSG, and would thus retain occupied habitats under BLM or FS management. This would reduce the likelihood of habitat conversion to agriculture, urbanization, or other uses that would remove sagebrush habitat.

Existing land use plans direction would apply under Alternative A. There would be no changes to the current National Forest System infrastructure including power lines, wind turbines, solar panels, communications towers, fences, or roads. Although mitigation is typically developed under the NEPA process and most right of way and surface developments are subject to limited operation periods or other stipulations in local GRSG conservation strategies, permitted right-of-ways (ROWs) or special use authorities (SUAs) would continue to allow construction, maintenance, and operation activities that could result in habitat loss, fragmentation, or degradation of GRSG habitat or result in barriers to migration corridors or seasonal habitats. Construction, maintenance, and use of infrastructure and ancillary facilities would continue to

lead to higher short-term concentrations of human noise and disturbance that could cause disruption of nesting activities, abandonment of young or temporary displacement; these could also facilitate establishment and spread of cheatgrass and other invasive weeds (see discussion on Vegetation and Soils) and an increase in edge habitat. Existing and new power lines, wind turbines, solar panels, communications towers, fences, and vehicles traveling on associated roads would continue to pose a collision hazard to GRSG or to provide potential perching and/or nesting habitat for avian predators that could result in declines in lek attendance or nest success. Though most projects would be forced to mitigate or minimize impacts, this alternative would likely have the greatest impact on the GRSG and its habitat.

### ***Cumulative Effects***

Current lands and realty (i.e., infrastructure) management activities would continue under Alternative A. ROW exclusion or avoidance areas would not be instituted as they would be in Alternatives B, C, D, or F. Therefore, under Alternative A, the direct and indirect effects of lands and realty management, in conjunction with the past, present and reasonably foreseeable future actions, may result in the increased loss and fragmentation of the existing sagebrush habitat and disturbance to GRSG in Management Zones III, IV and V (refer to Chapter 5 of the DEIS).

## **Travel, Transportation and Recreation Management**

### ***Direct and Indirect Effects***

Under current management, travel on most Forest Service-administered lands is limited to designated roads, although off road motorized big game retrieval within ½ mile of roads is authorized on the Mountain City, Ruby Mountains, and Jarbidge Ranger Districts of the Humboldt-Toiyabe National Forest, with some restrictions. Under Alternative A, there would be no changes to the current National Forest System Roads, transportation plan, or recreation management on these forests. There would be minimal seasonal restrictions on casual use and some of the areas within GRSG habitat would remain open to cross country travel. In general, the more acres and miles of routes that are designated in an area, the greater the likelihood of habitat fragmentation and introduction of invasive plants within GRSG habitat and disturbance on GRSG. In addition, less restrictive travel conditions usually mean higher concentrations of human use adjacent to motorized routes. This can cause disruption of nesting activities, abandonment of young and temporary displacement. Impacts from roads may include habitat loss from road construction, noise disturbance from vehicles, and direct mortality from collisions with vehicles. Roads may also present barriers to migration corridors or seasonal habitats. Although the majority of cross country travel for big game retrieval would occur outside of the GRSG lekking and breeding season limiting the potential for OHV-related disturbance impacts to GRSG, OHV use in these areas would still have the potential to fragment and introduce weeds into GRSG habitat. This alternative has the highest potential to impact GRSG due to the lack of restrictions on activities that cause these effects. Therefore all direct and indirect effects on the species and its habitat would likely cause current trends to continue.

### ***Cumulative Effects***

Recreation is considered a “lesser threat” with respect to “relative cumulative actions” addressed in the DEIS and only for Management Zone V (see Chapter 5 of the DEIS). Current travel, transportation and recreation management would continue under Alternative A. The limitation of motorized travel to existing routes and permitting of recreational SUAs that are neutral or beneficial to sage-grouse, as well as limited opportunities for road construction and upgrading of current roads, would not be instituted as they would be in Alternatives B, C, D and F. Under Alternative A, the direct and indirect effects from travel, transportation and recreation management, in conjunction with the past, present and reasonably foreseeable future actions, may result in the increased loss and fragmentation of the existing sagebrush habitat in Management Zones III, IV and V (refer to Chapter 5 of the DEIS).

## **Alternative B**

### **Vegetation and Soils**

#### ***Direct and Indirect Effects***

Under Alternative B, weed control efforts and pinyon-juniper encroachment would continue to be managed under current direction (see Alternative A). However, GRSG vegetation management conservation measures included in Alternative B would benefit weed and conifer control efforts by prioritizing restoration efforts, including reducing invasive plants in PPH, in order to benefit GRSG habitats. BLM and Forest Service would require the use of native seeds and would design post-restoration management to ensure the long-term persistence of the restoration efforts, and would consider changes in climate when determining species for restoration. Invasive species would also be monitored and controlled after fuels treatments and at existing and new range improvements in PPH. Alternative B incorporates fewer invasive plant management measures in PGH compared to PPH. However, many of the same habitat restoration and vegetation management actions would be applied, including prioritizing the use of native seeds. Together, these measures would reduce impacts from invasive plants and pinyon-juniper encroachment on GRSG habitat described under Alternative A although the effects of the treatments would be the same.

### ***Cumulative Effects***

Under Alternative B, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), current vegetation and soils management treatments, including mechanical, manual, chemical, and biological control of invasive plants and pinyon and juniper, would continue and the short-term negative impacts of these activities on GRSG and GRSG habitats would continue to be outweighed by the long-term beneficial impacts including increased forage, cover quality and composition, reduced predator perches, decreased fire spread and intensity and potentially increased water availability. However, additional emphasis on protecting existing sagebrush habitat, under Alternative B would provide an added benefit to GRSG habitat. Therefore, the direct and indirect effects of vegetation and soils management to Greater Sage-Grouse in



Management Zones III, IV and V from the management actions under Alternative B, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to Greater Sage-Grouse.

## **Livestock Grazing**

### ***Direct and Indirect Effects***

Alternative B would implement a number of beneficial management actions in PPH to incorporate sage-grouse habitat objectives and management considerations into livestock grazing management. These include completion of Land Health Assessments, consideration of grazing methods and systems to reduce impacts on sage-grouse habitat, consideration of retiring vacant allotments, improved management of riparian areas and wet meadows, evaluation of existing introduced perennial grass seedings, authorization of new water developments and structural range improvements only when beneficial to GRSG, BMPs for West Nile Virus, and fence removal, modification or marking. Several management actions to reduce impacts from livestock grazing on sage-grouse general habitat would be incorporated, including the potential to modify grazing systems to meet seasonal sage-grouse habitat requirements and management to improve the conditions of riparian areas and wet meadows. Together these efforts would reduce the impacts from grazing on GRSG described under Alternative A.

### ***Cumulative Effects***

Although livestock grazing occurs throughout all management zones, in the DEIS it is only considered a “lesser threat” with respect to “relative cumulative actions” and only for Management Zone V (see Chapter 5 of the DEIS). In addition, portions of Management Zone III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories which have the potential to compound the effects of livestock grazing on these lands. Forest Service-administered lands within Management zones IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); see Chapter 5 of the DEIS].

Under Alternative B, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), livestock grazing would continue to be managed through existing grazing plans and wild horse and burro Territories would be managed for Appropriate Management Level. However, additional emphasis on protecting existing sagebrush habitat under Alternative B would provide an added benefit to GRSG habitat. Therefore, the direct and indirect effects of livestock grazing and wild horse and burro management to Greater Sage-Grouse in Management Zones III, IV and V from the management actions under Alternatives B, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to Greater Sage-Grouse.

## **Fire and Fuels**

### ***Direct and Indirect Effects***

Under Alternative B, suppression would be prioritized in PPH to protect mature sagebrush habitat. Suppression would be prioritized in PGH only where fires threaten PPH. Alternative B does not include any other specific management for wildland fire management in PGH. Fuels treatments would be designed to protect sagebrush ecosystems by maintaining sagebrush cover, implementing fuel breaks, applying seasonal restrictions, protections for winter range, and requiring use of native seeds. Post-fuels treatments in PPH would be designed to ensure long-term persistence of seeded areas and native plants and maintain 15 percent canopy cover. Fuels treatments in PPH would also monitor and control for invasive species, and fuels management BMPs would incorporate invasive plant prevention measures. Overall, these conservation measures would reduce the threat of wildfire to sagebrush compared to Alternative A though, in general, the effects of fire suppression and fuels treatments would be similar to those of Alternative A.

### ***Cumulative Effects***

Management actions under Alternative B with regard to fire would increase protection of Greater Sage-Grouse habitat, primarily within PPH, thereby benefitting Greater Sage-Grouse rather than removing or fragmenting habitat. Under Alternative B, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), current wildfire suppression operations would continue, however, additional emphasis on protecting existing sagebrush habitat during suppression activities and pre-suppression planning and staging for maximum protection of Greater Sage-Grouse habitat would be included. Fuels treatment activities would focus on protecting Greater Sage-Grouse habitat, primarily within PPH. Therefore, the direct and indirect effects of fire to Greater Sage-Grouse in Management Zones III, IV and V from the management actions under Alternative B, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to Greater Sage-Grouse.

## **Wild Horse and Burro Management**

### ***Direct and Indirect Effects***

Under Alternative B, wild horses and burros would be managed at AML on the same number of acres as Alternative A, with gathers prioritized based on PPH habitat and emergency environmental issues. Wild Horse Territory (WHT) Plans would incorporate GRSG habitat objectives in PPH. Land health assessments to determine existing structure/condition/composition of vegetation within all Territories would be conducted. Implementation of any range improvements in PPH would follow the same guidance as identified for livestock grazing in this alternative including designing and locating new improvements only where they “conserve, enhance, or restore GRSG habitat through improved grazing management”. Design features could include treating invasive species associated with range improvements. Additional range improvements in PPH would specifically address the



needs of GRSG. In comparison to Alternative A, Alternative B would prioritize GRSG habitat objectives in WHT Plans and base AML numbers on GRSG habitat needs.

### ***Cumulative Effects***

Portions of Management Zone III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories. Forest Service-administered lands within Management zones IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); see Chapter 5 of the DEIS]. Although livestock grazing occurs throughout all management zones, and has the potential to compound the effects of livestock grazing on these lands, in the DEIS it is only considered a “lesser threat” with respect to “relative cumulative actions” and only for Management Zone V (see Chapter 5 of the DEIS).

Under Alternative B, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), wild horse and burro Territories would continue to be managed for Appropriate Management Level and livestock grazing would continue to be managed through existing grazing plans. However, additional emphasis on protecting existing sagebrush habitat under Alternative B would provide an added benefit to GRSG habitat. Therefore, the direct and indirect effects of livestock grazing and wild horse and burro management to Greater Sage-Grouse in Management Zones III, IV or V from the management actions under Alternative B, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to Greater Sage-Grouse.

## **Energy and Locatable Minerals Development**

### ***Direct and Indirect Effects***

Under this Alternative, PPH would be closed to new fluid mineral leasing, nonenergy leasable mineral leasing, and mineral material sales, and it would be proposed for withdrawal from mineral entry. In addition, mandatory BMPs would be applied as conditions of approval on fluid mineral leases. No surface occupancy (NSO) would be stipulated for leased fluid minerals within PPH. A 3% disturbance cap to activities in PPH would be applied and numerous conservation measures would be implemented to reduce impacts from mineral exploration and development activities in PPH. These measures would reduce the impacts of energy development on GRSG and GRSG PPH described under Alternative A.

Alternative B does not include specific management for fluid, saleable, locatable, and nonenergy leasable minerals in PGH or wind energy or solar energy development in PPH or PGH. As a result, current trends would continue and impacts would be similar to those under Alternative A. Although Alternative B does not directly address wind energy development or industrial solar development, its 3% threshold for anthropogenic disturbances (See Land Uses and Realty Management) would apply to energy development and would limit the extent of all types of energy development in PPH.

### ***Cumulative Effects***

Energy development is currently a minor threat present only in Management Zone III but geothermal energy development potential is high throughout Management Zone IV (refer to Chapter 5 of the DEIS). Mining is common across Management Zones III and IV in Nevada and occurs at a variety of scales. Management actions associated with energy and locatable minerals development under Alternative B would increase protection of Greater Sage-Grouse habitat, primarily within PPH, thereby benefitting Greater Sage-Grouse rather than removing or fragmenting habitat. Under Alternative B, within Management Zones III and IV, some of the current energy and locatable minerals management direction would continue, however, additional emphasis on protecting existing sagebrush habitat by adding all PPH to existing closures and proposing it for withdrawal would be included. Therefore, the direct and indirect effects of to Greater Sage-Grouse in Management Zones III, IV and V from the management actions associated with energy and locatable minerals development under Alternative B, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to Greater Sage-Grouse.

### **Land Uses and Realty Management**

#### ***Direct and Indirect Effects***

Under this alternative, all PPH would be managed as exclusion areas and PGH would be managed as an avoidance area for new ROW and SUA projects and co-location of new ROWs or SUAs with existing infrastructure would occur in PPH and PGH. It would also include the following within PPH: co-location of new ROWs or SUAs with existing infrastructure; removal, burying, or modification of existing power lines; co-location of new facilities with existing facilities, where possible; use of existing roads, or realignments to access valid existing rights that are not yet developed or constructing new roads to the absolute minimum standard necessary if valid existing rights could not be accessed via existing roads; and a 3% threshold on anthropogenic disturbance (including, but not limited to, highways, roads, geothermal wells, wind turbines, and associated facilities) within PPH.

In addition, Alternative B would contain provisions to retain public ownership of priority sage-grouse habitat and to acquire state and private lands with intact subsurface mineral estate where suitable conservation actions for GRSG could not otherwise be achieved. This alternative would benefit GRSG by maximizing connectivity and minimizing loss, fragmentation, degradation and disturbance of sagebrush habitats within PPH by power lines, communication towers and roads. GRSG and GRSG habitat outside PPH would likely experience little change in direct or indirect effects. However, if the 3% development threshold ended up concentrating new infrastructure development outside PPH rather than just reducing it within PPH, the extent of impacts on GRSG and GRSG habitat outside PPH could increase under Alternative B relative to Alternative A. Alternative B would reduce the likelihood of collisions addressed in Alternative A. These

conservation measures make this alternative more protective than Alternative A, although the general effects would be the same.

### ***Cumulative Effects***

Management actions associated with lands and realty under Alternatives B would increase protection of Greater Sage-Grouse habitat, thereby benefitting Greater Sage-Grouse rather than removing or fragmenting habitat. Under Alternative B, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), some of the current land and realty operations would continue, however, additional emphasis on protecting existing sagebrush habitat and preventing disturbance to GRSG would be included. Lands and realty management activities would focus ROW exclusion or avoidance areas in Greater Sage-Grouse habitat. Therefore, the direct and indirect effects of lands and realty management to Greater Sage-Grouse in Management Zones III, IV and V under Alternative B, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions, would not substantially increase impacts to Greater Sage-Grouse.

## **Travel, Transportation and Recreation Management**

### ***Direct and Indirect Effects***

Under Alternative B, motorized travel in PPH would be limited to designated roads, primitive roads, and trails at a minimum. Only recreational SUAs that are neutral or beneficial to sage-grouse would be permitted in PPH and there would be limited opportunities for road construction in PPH, with minimum standards applied and no upgrading of current roads. Although general impacts would be the same as Alternative A, Alternative B is more restrictive than Alternative A and it would reduce loss, fragmentation and disturbance to GRSG leks and nesting habitat by limiting motorized travel to designated routes, minimizing human use and road construction or upgrades and reducing automotive collisions with individual birds.

### ***Cumulative Effects***

Recreation is considered a “lesser threat” with respect to “relative cumulative actions” addressed in the DEIS and only for Management Zone V (see Chapter 5 of the DEIS). Management actions associated with travel, transportation and recreation under Alternative B would increase protection of Greater Sage-Grouse habitat, primarily within PPH, thereby benefitting Greater Sage-Grouse rather than removing or fragmenting habitat. Under Alternative B, within Management Zones III, IV and V, some of the current travel, transportation and recreation management direction would continue, however, additional emphasis on protecting existing sagebrush habitat would be included. Therefore, the direct and indirect effects of travel, transportation and recreation management to Greater Sage-Grouse in Management Zones III, IV and V under Alternative B, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to Greater Sage-Grouse.

## Alternative C

### Vegetation and Soils

#### *Direct and Indirect Effects*

Alternative C would maintain the direction described under Alternative A for weed control and pinyon-juniper encroachment and include additional provisions that would limit invasive weed spread in all occupied GRSG habitat. Vegetation management would benefit weed control efforts, by prioritizing restoration, including reducing invasive plants, in order to benefit sage-grouse habitats. In all cases, local native plant ecotype seeds and seedlings would be used. These policies would reduce impacts from invasive plants described under Alternative A and have similar impacts associated with treatment, but would include additional conservation measures specific to limiting the spread of invasive plants. In addition, grazing would be eliminated within all occupied sage-grouse habitat, eliminating the potential for invasive plant spread by livestock. This would make Alternative C more protective of GRSG and GRSG habitat than Alternatives A or B.

#### *Cumulative Effects*

Under Alternative C, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), current vegetation and soils management treatments, including mechanical, manual, chemical, and biological control of invasive plants and pinyon and juniper, would continue and the short-term negative impacts of these activities on GRSG and GRSG habitats would continue to be outweighed by the long-term beneficial impacts including increased forage, cover quality and composition, reduced predator perches, decreased fire spread and intensity and potentially increased water availability. However, additional emphasis on protecting existing sagebrush habitat under Alternative C would provide an added benefit to GRSG habitat. Therefore, the direct and indirect effects of vegetation and soils management to Greater Sage-Grouse in Management Zones III, IV and V from the management actions under Alternative C, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to Greater Sage-Grouse.

### Livestock Grazing

#### *Direct and Indirect Effects*

Under Alternative C, grazing would be eliminated within all occupied sage-grouse habitat (PPH and PGH) reducing both the negative and positive grazing-related impacts on GRSG and GRSG habitat discussed under Alternative A more so than any of the other alternatives. No new water developments or range improvements would be constructed in occupied habitat and only habitat treatments that benefit GRSG would be allowed. Retirement of grazing would be allowed and fast tracked.

### ***Cumulative Effects***

Although livestock grazing occurs throughout all management zones, in the DEIS it is only considered a “lesser threat” with respect to “relative cumulative actions” and only for Management Zone V (see Chapter 5 of the DEIS). Under Alternative C, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), livestock grazing would be eliminated within all occupied GRSG habitat, providing a net benefit to GRSG habitat. Therefore, the direct and indirect effects of livestock grazing to Greater Sage-Grouse in Management Zones III, IV and V from management under Alternative C, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to Greater Sage-Grouse.

### **Fire and Fuels**

#### ***Direct and Indirect Effects***

Alternative C is similar to Alternative B except that it is more protective of GRSG and GRSG habitat because prioritization of suppression would apply to PGH in addition to PPH (i.e., All Occupied Habitat), it includes measures to manage vegetation for good or better ecological condition, and it focuses fuel breaks on areas of human habitation or significant disturbance. The general effects of fire suppression and fuels treatments would be similar to those of Alternative A.

### ***Cumulative Effects***

The cumulative effect of management actions related to fire and fuels under Alternative C, when combined with the past, present and reasonably foreseeable future actions are similar to the cumulative effects described in Alternative B, and are not expected to be substantial, change the existing population trend, or remove and fragment sagebrush habitat past a critical threshold within Management Zones III, IV and V (refer to Chapter 5 of the DEIS).

### **Wild Horse and Burro Management**

#### ***Direct and Indirect Effects***

Under Alternative C, wild horses and burros would be managed at AML. However, AML establishment would be analyzed in conjunction with livestock numbers during grazing permit renewals. Combined with the removal of some fences during “active restoration” processes related to livestock grazing, horses and burros would be expected to range over a larger area than in Alternative A and would necessitate the need for increased gather schedules. The increase in access to riparian and upland habitats that are currently protected by fences, and expected temporary increases in horses and burros over AML, could over time reduce food and cover for GRSG and change water holding capacities of riparian brood rearing sites compared to Alternative A, although needs of GRSG would be fully considered as part of the AML establishment process.

### ***Cumulative Effects***

Portions of Management Zone III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories. Forest Service-administered lands within Management zones IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); see Chapter 5 of the DEIS]. Under Alternative C, wild horse and burro Territories would be managed for AML as under current management, however, there would be fewer restrictions on wild horse and burro movement than under Alternative A. Therefore, the direct and indirect effects of wild horse and burro management under Alternative C, in conjunction with the past, present and reasonably foreseeable future actions, may result in the increased loss and fragmentation of the existing sagebrush habitat in Management Zones III, IV and V (refer to Chapter 5 of the DEIS).

## **Energy and Locatable Minerals Development**

### ***Direct and Indirect Effects***

Alternative C would expand several of the protections under Alternative B to all occupied habitat as well as prohibit new exploration permits for unleased fluid minerals (also see Land Uses and Realty Management below). Like Alternative B, the conservation measures proposed under Alternative C would reduce the impacts of energy and locatable minerals development on GRSG described under Alternative A, but to a larger degree than any of the other alternatives.

### ***Cumulative Effects***

Energy development is currently a minor threat present only in Management Zone III but geothermal energy development potential is high throughout Management Zone IV (refer to Chapter 5 of the DEIS). Mining is common across Management Zones III and IV in Nevada and occurs at a variety of scales. Management actions under Alternative C with regard to energy and locatable minerals development would increase protection of all occupied habitat, thereby benefitting Greater Sage-Grouse rather than removing or fragmenting habitat. Under Alternative C, within Management Zones III and IV, some of the current energy and locatable minerals management direction would continue, however, additional emphasis on protecting existing sagebrush habitat by adding all occupied habitat to existing closures and proposing it for withdrawal would be included. Therefore, the direct and indirect effects of fire to Greater Sage-Grouse in Management Zones III, IV and V from the management actions under Alternative C, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to Greater Sage-Grouse (refer to Chapter 5 of the DEIS).

## **Land Uses and Realty Management**

### ***Direct and Indirect Effects***

Alternative C would have the most protective measures for GRSG. Alternative C would extend many of the Alternative B conservation measures to all occupied habitat and all occupied habitat



would be managed as an exclusion area for new ROW projects. As a result, management under Alternative C would encourage consolidation of sage-grouse habitats, facilitating habitat conservation and management and reduce the impacts of infrastructure on GRSG described under Alternatives A and B in a wider area than Alternative B.

Unlike Alternative B, which would permit wind energy siting in PPH provided a development disturbance threshold of 3% were not exceeded, Alternative C would not permit wind energy development siting in all occupied GRSG habitat. This would reduce the effects of wind energy on GRSG as discussed under Alternative A more so than Alternative B.

### ***Cumulative Effects***

Management actions associated with lands and realty under Alternative C would increase protection of Greater Sage-Grouse habitat, thereby benefitting Greater Sage-Grouse rather than removing or fragmenting habitat. Under Alternative C, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), some of the current land and realty operations would continue, however, additional emphasis on protecting existing sagebrush habitat and preventing disturbance to GRSG would be included. Lands and realty management activities would focus ROW exclusion or avoidance areas in Greater Sage-Grouse habitat. Therefore, the direct and indirect effects of lands and realty management to Greater Sage-Grouse in Management Zones III, IV and V under Alternative C, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to Greater Sage-Grouse.

## **Travel, Transportation and Recreation Management**

### ***Direct and Indirect Effects***

Alternative C is similar to Alternative B except that it would apply to all occupied habitat and, therefore, protect a larger area of GRSG habitat than Alternative B from the same types of general recreational impacts described in Alternative A.

### ***Cumulative Effects***

Recreation is considered a “lesser threat” with respect to “relative cumulative actions” addressed in the DEIS and only for Management Zone V (see Chapter 5 of the DEIS). Management actions associated with travel, transportation and recreation under Alternative C would increase protection of all occupied Greater Sage-Grouse habitat, thereby benefitting Greater Sage-Grouse rather than removing or fragmenting habitat. Under Alternative C, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), some of the current travel, transportation and recreation management direction would continue, however, additional emphasis on protecting existing sagebrush habitat would be included. Therefore, the direct and indirect effects of travel, transportation and recreation management to Greater Sage-Grouse in Management Zones III, IV and V under Alternative C, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to Greater Sage-Grouse.

## Alternative D

### Vegetation and Soils

#### *Direct and Indirect Effects*

Alternative D would treat sites within priority and general sage-grouse habitat that are dominated by invasive species through an IVM approach using fire, chemical, mechanical and biological methods based on site potential. Targeted grazing would be allowed to suppress cheatgrass or other vegetation that are hindering achieving sage-grouse objectives in priority and general habitat. Sheep, cattle, or goats may be used as long as the animals are intensely managed and removed when the utilization of desirable species reaches 35%. In perennial grass, invasive annual grass, and conifer-invaded cover types, sagebrush steppe would be restored with sagebrush seedlings where feasible.

Pinyon and juniper treatment in encroached sagebrush vegetation communities in priority habitat and general habitat would focus on enhancing, reestablishing, or maintaining habitat components (e.g. cover, security, food, etc.) in order to achieve habitat objectives. Phase II and III pinyon and/or juniper stands would be removed or reduced in biomass to meet fuel and sage-grouse habitat objectives and appropriate action would be taken to establish desired understory species composition, including seeding and invasive species treatments. Treatment methods that maintain sagebrush and shrub cover and composition would be used in areas with a sagebrush component.

Alternative D would be more protective of GRSG habitat than Alternative B because it contains several conservation measures specifically targeted to invasive species infestations and pinyon-juniper encroachment and it would apply them over a larger area (within priority and general habitat) than Alternative B (only PPH).

#### *Cumulative Effects*

Under Alternative D, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), current vegetation and soils management treatments, including mechanical, manual, chemical, and biological control of invasive plants and pinyon and juniper, would continue and the short-term negative impacts of these activities on GRSG and GRSG habitats would continue to be outweighed by the long-term beneficial impacts including increased forage, cover quality and composition, reduced predator perches, decreased fire spread and intensity and potentially increased water availability. However, additional emphasis on protecting existing sagebrush habitat under Alternative D would provide an added benefit to GRSG habitat. Therefore, the direct and indirect effects of vegetation and soils management to Greater Sage-Grouse in Management Zones III, IV and V from the management actions under Alternative D, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to Greater Sage-Grouse.



## **Livestock Grazing**

### ***Direct and Indirect Effects***

Alternative D, similar to Alternative B, would implement a number of beneficial management actions to incorporate sage-grouse habitat objectives and management considerations into livestock grazing management: consideration of grazing methods and systems to reduce impacts on sage-grouse habitat, consideration of retiring vacant allotments, improved management of riparian areas and wet meadows, evaluation of existing introduced perennial grass seedings, authorization of new water developments and structural range improvements only when beneficial to GRSG, the potential to modify grazing systems to meet seasonal sage-grouse habitat requirements and fence removal, modification or marking. The main difference is that Alternative D would apply these conservation measures to priority and general habitat rather than limiting them to PPH as Alternative B would and Alternative D would not require the completion of Land Health Assessments to determine if standards of range-land health are being met as Alternative B would. These measures would reduce the negative impacts from grazing on GRSG described under Alternative A probably more so than Alternative B but less so than Alternative C that would eliminate livestock grazing in all occupied habitat.

### ***Cumulative Effects***

Although livestock grazing occurs throughout all management zones, in the DEIS it is only considered a “lesser threat” with respect to “relative cumulative actions” and only for Management Zone V (see Chapter 5 of the DEIS). In addition, portions of Management Zone III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories which have the potential to compound the effects of livestock grazing on these lands; Forest Service-administered lands within Management zones IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); see Chapter 5 of the DEIS].

Under Alternative D, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), livestock grazing would continue to be managed through existing grazing plans and wild horse and burro Territories would be managed for Appropriate Management Level. However, additional emphasis on protecting existing sagebrush habitat under Alternative D would provide an added benefit to GRSG habitat. Therefore, the direct and indirect effects of livestock grazing and wild horse and burro management to Greater Sage-Grouse in Management Zones III, IV and V from the management actions under Alternative D, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions, would not substantially increase impacts to Greater Sage-Grouse.

## **Fire and Fuels**

### ***Direct and Indirect Effects***

Unlike Alternative B, in which suppression would be prioritized in PPH, but only in PGH where fires threaten PPH, Alternative D would prioritize suppression in priority and general sage-

grouse habitat. In priority and general habitat, fuels treatments emphasizing maintaining, protecting, and expanding GRSG habitat would be designed and implemented and would include measures similar to Alternative B except they would apply to priority and general habitat rather than only PPH. These include generally enhancing or maintaining/retaining sagebrush canopy cover and community structure; applying appropriate seasonal restrictions for implementing fuels treatments according to the type of sage-grouse seasonal habitats present; and requiring use of native seeds for fuels management treatment based on availability, adaptation (site potential), and probability of success. In addition, Alternative D would not allow fuels treatment projects to be implemented in priority and general habitat if it is determined the treatment would not be beneficial to GRSG or its habitat. It would identify opportunities for prescribed fire and require use of certified weed-free seeds. Alternative D would prioritize pre-suppression activities in sage-grouse habitats that are vulnerable to wildfire events and post-fire treatments in priority and general habitat to maximize benefits to greater sage-grouse. Overall, these conservation measures would reduce the threat of wildfire to sagebrush compared to Alternative A, although in general, the effects of fire suppression and fuels treatments would be similar to those of Alternative A. Prioritization of suppression and fuels treatments in priority and general habitat under Alternative D, rather than limiting them to PPH under Alternative B, would make Alternative D more protective of GRSG and GRSG habitat, in the long term, than Alternative B.

### ***Cumulative Effects***

The cumulative effect of management actions under Alternative D, when combined with the past, present and reasonably foreseeable future actions are similar to the cumulative effects described in Alternative B, and are not expected to be substantial, change the existing population trend, or remove and fragment sagebrush habitat past a critical threshold within Management Zones III, IV and V (refer to Chapter 5 of the DEIS).

### **Wild Horse and Burro Management**

#### ***Direct and Indirect Effects***

Under Alternative D, gathers would be prioritized in priority and general habitat as opposed to only PPH under Alternative B. Otherwise Alternative B is similar to management proposed in Alternative B in that wild horse and burro populations would be managed within established AML to meet sage-grouse habitat objectives for all WHTs within or containing priority or general habitat. Unlike Alternative B, adjustments to AML through the NEPA process would be considered in WHTs not meeting standards due to degradation that can be at least partially contributed to wild horse or burro populations; adjustments would be based on monitoring data and would seek to protect and enhance priority and general habitat and establish a thriving ecological balance. Alternative D would be expected to reduce the impacts of wild horses and burros on GRSG described under Alternative A over a larger area than Alternative B.

### ***Cumulative Effects***

Portions of Management Zone III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories. Forest Service-administered lands within Management zones IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); see Chapter 5 of the DEIS]. Although livestock grazing occurs throughout all management zones, and has the potential to compound the effects of livestock grazing on these lands, in the DEIS it is only considered a “lesser threat” with respect to “relative cumulative actions” and only for Management Zone V (see Chapter 5 of the DEIS).

Under Alternative D, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), wild horse and burro Territories would be managed for Appropriate Management Level and livestock grazing would continue to be managed through existing grazing plans. However, additional emphasis on protecting existing sagebrush habitat under Alternative D would provide an added benefit to GRSG habitat. Therefore, the direct and indirect effects of livestock grazing and wild horse and burro management to Greater Sage-Grouse in Management Zones III, IV and V from the management actions under Alternative D, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions, would not substantially increase impacts on Greater Sage-Grouse.

### ***Energy and Locatable Minerals Development***

#### ***Direct and Indirect Effects***

Under Alternative D, a NSO stipulation, with no allowance for waivers, exceptions, or modifications, would be applied to un-leased federal fluid mineral estate in priority sage-grouse habitat and a NSO stipulation, with allowance for waivers, exception, or modifications, would be applied in un-leased federal fluid mineral estate in general sage-grouse habitat. Geophysical exploration that does not result in crushing of sagebrush vegetation or create new or additional surface disturbance would be allowed within priority and general sage-grouse habitat, but geophysical operations would be subject to timing and controlled surface use limitations. Proposed surface disturbance in unleased priority habitat must achieve no net unmitigated loss of priority habitat; seasonal restrictions on exploratory drilling that prohibit surface-disturbing activities in winter habitat and during the lekking, nesting, and early brood-rearing season would be applied in all priority sage-grouse habitat. Required Design Features (RDFs) would be applied as Conditions of Approval within priority and general sage-grouse habitat on existing fluid mineral leases.

Similar to Alternative A, new plans of operation for authorized locatable minerals on forest service-administered lands would require the inclusion of measures to avoid or minimize adverse effects to GRSG populations or their habitat. Priority and general habitat would be closed to non-energy leasable mineral leasing and prospecting. No new commercial mineral material sales would be allowed in priority and general habitat, but sales to meet Federal, Tribal, State, County

and public needs would be allowed in general habitat; loss of habitat through disturbance in general habitat would be off-set through off-site mitigation. Alternative D would manage priority and general habitat as ROW exclusion areas for new large-scale wind and solar energy facilities (see Land Uses and Realty Management), whereas Alternative B would manage PPH as a new ROW exclusion area and PGH as a new ROW avoidance area.

Although the conservation measures proposed under Alternative D would overall reduce the general impacts on GRSG associated with energy and locatable minerals development discussed under Alternative A, Alternative D would be less protective of PPH than Alternative B with respect to new fluid mineral leasing, because Alternative B would close PPH to new fluid mineral leasing. On the other hand, it would be more protective of PGH than Alternative B with respect to new fluid mineral leasing, because Alternative B does not include specific management for new or existing fluid minerals leasing in general habitat. Alternative D would be similar to Alternative B with respect to existing fluid mineral leases by requiring application of design features in priority habitat. Under Alternative D, both priority and general habitat would be closed to non-energy leasable mineral leasing and prospecting as opposed to only PPH under Alternative B.

### ***Cumulative Effects***

Energy development is currently a minor threat present only in Management Zone III but geothermal energy development potential is high throughout Management Zone IV (refer to Chapter 5 of the DEIS). Mining is common across Management Zones III and IV in Nevada and occurs at a variety of scales. Under Alternative D, within Management Zones III IV and V, some of the current management direction associated with energy and locatable minerals development would continue, however, additional emphasis on protecting existing sagebrush would be included. Alternative D is the same as Alternative A with respect to areas closed to entry, but adds NSO restrictions to all PPH and PGH without waiver, exception, or modification. NSO restrictions would apply to PGH with allowance for waivers, exceptions and modifications. Management under Alternatives D would maintain current acreage open to mineral development but add the application of best management practices and off-site mitigation. Therefore, the direct and indirect effects of energy and locatable minerals development to Greater Sage-Grouse in Management Zones III, IV and V from the added management actions under Alternative D, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to Greater Sage-Grouse (refer to Chapter 5 of the DEIS).

### **Land Uses and Realty Management**

#### ***Direct and Indirect Effects***

Like Alternative B, Alternative D would contain provisions to retain public ownership of priority sage-grouse habitat and to acquire state and private lands with intact subsurface mineral estate where suitable conservation actions for GRSG could not otherwise be achieved, require co-

location of new ROWs or SUAs associated with valid existing rights with existing development, and, where appropriate, bury new and existing utility lines as mitigation unless not feasible. Unlike Alternative B, Alternative D would manage priority and general habitat as ROW exclusion areas for new large-scale commercial wind and solar energy facilities and ROW avoidance areas for all other ROWs or SUAs. Development within avoidance areas could occur if the development incorporates appropriate RDFs in design and construction (e.g. noise, tall structure, seasonal restrictions, etc.) and development results in no net un-mitigated loss of priority or general habitat. In addition, ROW holders in priority and general habitat would be required to retro-fit existing power lines and other utility structure with perch-detering devices during ROW renewal process. These conservation measures make this alternative more protective than Alternative A, although the general effects would be the same. It would be less protective than Alternatives B and C with respect to new siting of general ROWs and SUAs because priority habitat would be an avoidance area rather than an exclusion area. But it would be more protective with respect to large-scale commercial wind and solar energy facilities by excluding them in priority and general habitat altogether.

### ***Cumulative Effects***

Management actions associated with land uses and realty under Alternative D would increase protection of Greater Sage-Grouse habitat, thereby benefitting Greater Sage-Grouse rather than removing or fragmenting habitat. Under Alternative D, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), some of the current land and realty operations would continue, however, additional emphasis on protecting existing sagebrush habitat and preventing disturbance to GRSB would be included. Land uses and realty management activities would focus ROW exclusion or avoidance areas in Greater Sage-Grouse habitat. Therefore, the direct and indirect effects of lands and realty management to Greater Sage-Grouse in Management Zones III, IV and V under Alternative D, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions, would not substantially increase impacts to Greater Sage-Grouse.

## **Travel, Transportation and Recreation Management**

### ***Direct and Indirect Effects***

Under current management, travel on most Forest Service-administered lands is limited to designated roads, although off road motorized big game retrieval within ½ mile of roads is authorized on the Mountain City, Ruby Mountains, and Jarbidge Ranger Districts of the Humboldt-Toiyabe National Forest, with some restrictions. Like Alternative B, Alternative D would limit motorized travel to designated routes, there would be limited opportunities for road construction with minimum standards applied and no upgrading of current roads, and only recreational SUAs that are neutral or beneficial to sage-grouse would be permitted. Unlike Alternative B, Alternative D would extend these measures beyond PPH to include PGH. In addition, under Alternative D no new recreation facilities (including, but not limited to, campgrounds, day use areas, scenic pullouts, trailheads, etc.) would be constructed in priority

and general habitat. Although general impacts would be the same as Alternative A, Alternative D is more restrictive than Alternative A or Alternative B. It would likely reduce loss, fragmentation and disturbance to GRSB leks and nesting habitat by minimizing human use and road construction or upgrades and reducing automotive collisions with individual birds.

### ***Cumulative Effects***

Recreation is considered a “lesser threat” with respect to “relative cumulative actions” addressed in the DEIS and only for Management Zone V (see Chapter 5 of the DEIS). Management actions associated with travel, transportation and recreation under Alternative D would increase protection of Greater Sage-Grouse habitat within PPH and PGH, thereby benefitting Greater Sage-Grouse rather than removing or fragmenting habitat. Under Alternative D, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), some of the current travel, transportation and recreation management direction would continue, however, additional emphasis on protecting existing sagebrush habitat would be included. Therefore, the direct and indirect effects of travel, transportation and recreation management to Greater Sage-Grouse in Management Zones III, IV and V under Alternative D, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions, would not substantially increase impacts to Greater Sage-Grouse.

### ***Alternative E***

All management actions under Alternative E would correspond to areas identified on the Sage-Grouse Management Areas (SGMAs) Map contained in the “2012 Strategic Plan for the Conservation of Greater Sage-Grouse in Nevada” (2012 Plan) produced by Nevada stakeholders at the request of the governor. The SGMAs include four categories - Occupied Habitat, Suitable Habitat, Potential Habitat, and Non Habitat areas - as defined in the 2012 Plan. The Nevada Sagebrush Ecosystem Council would further refine the habitat categories within the SGMAs and determine where the best possible habitat exists based on recommendations from the Nevada Sagebrush Ecosystem Technical Team. All management Actions would be implemented through a coordinated effort among local, state and federal agencies, unless an agency is specifically noted. Alternative E would not provide fixed exclusion or avoidance areas, but would seek to achieve conservation through a goal of “no net loss” in the Occupied, Suitable and Potential Habitat categories for activities that could be controlled, such as a planned disturbance or development. Management under Alternative E would be subject to an avoid, minimize, and mitigate approach, which would provide a lower level of certainty than alternatives that have fixed exclusion and avoidance land allocations based on PPH and PGH designations.

### ***Vegetation and Soils***

#### ***Direct and Indirect Effects***

Under Alternative E, landscape-level treatments in Sage-Grouse Management Areas (SGMAs) would be initiated to reverse the effects of pinyon-juniper encroachment and restore healthy, resilient sagebrush ecosystems. Plans to remove Phase I and Phase II encroachment and treat



Phase III encroachment would be aggressively implemented to reduce the threat of severe conflagration and restore SGMAs where possible, especially in areas in close proximity to Occupied and Suitable Habitat. Temporary roads to access treatment areas would be allowed and constructed with minimum design standards to avoid and minimize impacts and removed and restored upon completion of treatment. Under Alternative E, the State of Nevada would continue to incentivize and assist in the development of bio-fuels and other commercial uses of pinyon-juniper resources and increase the incentives for private industry investment in biomass removal, land restoration, and renewable energy development by authorizing stewardship contracts for up to 20 years. Alternative E would provide for an increase in conifer encroachment efforts for GRSG habitat compared to Alternative A and addresses it more specifically than Alternatives B or C.

Under Alternative E, invasive plants would be managed through a combination of surveys, biological control, educational activities, native planting and reseedling of previously treated sites in areas susceptible to invasion, and weed-free gravel and forage certifications and inspections. SGMAs would be managed to prevent invasive species and to suppress and restore areas with existing infestations. Existing areas of invasive vegetative that pose a threat to SGMAs would be treated through the use of herbicides, fungicides or bacteria to control cheatgrass and medusahead infestations. All burned areas within SGMAs would be reviewed and evaluated in a timely manner to ascertain the reclamation potential for reestablishing Sage-Grouse habitat, enhancing ecosystem resiliency, and controlling invasive weed species.

### ***Cumulative Effects***

Under Alternative E, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), current vegetation and soils management treatments, including mechanical, manual, chemical, and biological control of invasive plants and pinyon and juniper, would continue and the short-term negative impacts of these activities on GRSG and GRSG habitats would continue to be outweighed by the long-term beneficial impacts including increased forage, cover quality and composition, reduced predator perches, decreased fire spread and intensity and potentially increased water availability. However, additional emphasis on protecting existing sagebrush habitat under Alternative E would provide an added benefit to GRSG habitat. Therefore, the direct and indirect effects of vegetation and soils management to Greater Sage-Grouse in Management Zones III, IV and V from the management actions under Alternative E, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to Greater Sage-Grouse.

### ***Livestock Grazing***

#### ***Direct and Indirect Effects***

Alternative E would manage grazing permits to maintain or enhance SGMAs. It would utilize livestock grazing, when appropriate, as a management tool, to improve Sage-Grouse habitat

quantity, quality or to reduce wildfire threats. Alternative E would expand the promotion of proper livestock grazing practices that promote the health of perennial grass communities in order to suppress the establishment of cheatgrass. Riparian areas would be managed to current agency standards. Within riparian areas, Alternative E would promote grazing within acceptable limits and development of additional infrastructure (e.g., fences and troughs) in order to facilitate this action. In comparison with Alternative A, management under Alternative E would provide less protection to GRSG and their habitats. There are fewer conservation measures associated with this alternative including no management actions associated with direct impacts on GRSG or lek or nesting habitat (refer to Alternative A). Riparian impacts would be expected to be greater due to more areas being available for livestock use and fewer overall GRSG specific habitat enhancement/maintenance actions would occur under this alternative.

### ***Cumulative Effects***

Although livestock grazing occurs throughout all management zones, in the DEIS it is only considered a “lesser threat” with respect to “relative cumulative actions” and only for Management Zone V (see Chapter 5 of the DEIS). In addition, portions of Management Zone III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories which have the potential to compound the effects of livestock grazing on these lands; Forest Service-administered lands within Management zones IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); see Chapter 5 of the DEIS].

Under Alternative E, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), there would be fewer restrictions on livestock grazing than under Alternative A, including no management actions associated with direct impacts on GRSG or leks or nesting habitat. In addition, riparian impacts would be expected to be greater due to more areas being available for livestock use and fewer overall GRSG specific habitat enhancement/maintenance actions would occur. Wild horse and burro Territories would be managed for Appropriate Management Level as under current management. Under Alternative E, the direct and indirect effects of livestock grazing, in conjunction with the past, present and reasonably foreseeable future actions, could result in the increased loss and fragmentation of the existing sagebrush habitat in Management Zones III, IV and V (refer to Chapter 5 of the DEIS).

## **Fire and Fuels**

### ***Direct and Indirect Effects***

Alternative E would utilize a unique approach to fire and fuels management. Under Alternative E, emphasis would be on sagebrush habitat protection and restoration within the State of Nevada Sage-Grouse Management Areas. With respect to hazardous fuels treatments, this alternative sets a goal of supporting incentives for developing a beneficial use for biomass. Wildland fires in SGMAs would be managed to reduce the number of wildfires that escape initial attack and become greater than 300 acres down to two to three percent of all wildfire ignitions over a ten



year period. Additional emphasis under Alternative E integrates the prepositioning of suppression resources and preventative actions similar to Alternative D. Prepositioning and preventative actions would increase the likelihood of successful fire management actions with response to wildfire. Fuels reduction treatments would be similar to Alternative B, with added emphasis on coordination of state and local agencies and individual landowners.

### ***Cumulative Effects***

The cumulative effect of management actions under Alternative E, when combined with the past, present and reasonably foreseeable future actions are similar to the cumulative effects described in Alternative B, and are not expected to be substantial, change the existing population trend, or remove and fragment sagebrush habitat past a critical threshold within Management Zones III, IV and V (refer to Chapter 5 of the DEIS).

## **Wild Horse and Burro Management**

### ***Direct and Indirect Effects***

Management under Alternative E would maintain wild horses at AML in WHTs to avoid and minimize impacts on Sage-Grouse Management Areas, evaluate conflicts with WHT designations in Sage-Grouse Management Areas, modify Land Use Plans and Resource Management Plans to avoid negative impacts on GRSG and, if necessary, resolve conflicts between the Wild and Free Roaming Horse and Burro Act and the Endangered Species Act. Wild horse and burro management under Alternative E would be similar to Alternative A. Therefore, impacts to Greater Sage-Grouse are expected to be similar.

### ***Cumulative Effects***

Portions of Management Zone III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories. Forest Service-administered lands within Management zones IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); see Chapter 5 of the DEIS]. Under Alternative E, wild horse and burro Territories would be managed for Appropriate Management Level as under current management. Therefore, the direct and indirect effects of wild horse and burro management to Greater Sage-Grouse in Management Zones III, IV and V from the management actions under Alternative E, which would be largely neutral for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions, would not substantially increase impacts to Greater Sage-Grouse.

## **Energy and Locatable Minerals Development**

### ***Direct and Indirect Effects***

The Alternative E management strategy would be to avoid conflicts with GRSG habitat by siting new minerals and energy facilities and activities outside of habitat wherever possible. Projects that have an approved BLM notice, plan of operation, right-of-way, or drilling plan would be exempt from any new mitigation requirements above and beyond what has already been

stipulated in the projects' approvals. Exploration projects would be designed for mineral access and the betterment of GRSG habitat. Roads and other ancillary features that impact GRSG habitat would be designed to avoid where feasible and otherwise minimize and mitigate impacts in the short and long term. New linear features would be sited in existing corridors or, at a minimum, co-located with existing linear features in SGMAs. Measures to deter raptor perching and raven nesting on elevated structures would be applied to energy development projects. Energy developers would be required to work closely with state and federal agency experts to determine important GRSG nesting, brood rearing and winter habitats and avoid those areas, and energy development or infrastructure features would be restricted within a 0.6 mile (1 km) radius around seeps, springs and wet meadows within identified brood rearing habitats wherever possible. As previously stated, Alternative E does not provide fixed exclusion or avoidance areas, leaving all management subject to an avoid, minimize, and mitigate approach, which provides a lower level of certainty than alternatives that have fixed exclusion and avoidance land allocations based on PPH and PGH designations. Under Alternative E, there would be the possibility for more land use for both energy and minerals development than under Alternative A, because construction of projects within or adjacent to GRSG habitat would not be ruled out, but the amount is not quantifiable. Therefore, the general impacts of energy and locatable minerals development on GRSG discussed under Alternative A would have the potential to increase under Alternative E.

### ***Cumulative Effects***

Energy development is currently a minor threat present only in Management Zone III but geothermal energy development potential is high throughout Management Zone IV (refer to Chapter 5 of the DEIS). Mining is common across Management Zones III and IV in Nevada and occurs at a variety of scales. Under Alternative E, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), there would be no fixed exclusion or avoidance areas, as under Alternatives B, C, D or F, leaving all management subject to an avoid, minimize, and mitigate approach, which provides a lower level of certainty than alternatives that have fixed exclusion and avoidance land allocations based on habitat designations. In addition, there would be the possibility for more land use for both energy and minerals development than under Alternative A, because construction of projects within or adjacent to GRSG habitat would not be ruled out. Therefore, under Alternative E, the direct and indirect effects of energy and locatable minerals development, in conjunction with the past, present and reasonably foreseeable future actions, may result in the increased loss and fragmentation of the existing sagebrush habitat in Management Zones III, IV or V (refer to Chapter 5 of the DEIS).

## **Land Uses and Realty Management**

### ***Direct and Indirect Effects***

Under Alternative E, no areas would be subject to exclusion or avoidance, but habitat disturbance, including habitat improvement projects, in Occupied and Suitable Habitat would be limited to not more than five percent per year, and in Potential Habitat to not more than twenty

percent per year, per SGMA, unless habitat treatments show credible positive results. On federal lands in Nevada with pre-approved activities, no new mitigation would take place beyond previously approved in Plans of Development, right of ways, or drilling plans. General guidance would be to avoid when possible, minimize adverse effects as practicable, and mitigate adverse effects in Occupied or Suitable Habitat. Whenever possible, this alternative would locate facilities in non-habitat areas, site new linear features in existing corridors or co-locate them with other existing features and engage in reclamation and weed control efforts. This alternative provides fewer measures when compared to Alternatives A, B, C, D or F to reduce the general impacts of land uses and realty management described under Alternative A to GRSG and sagebrush habitats. Therefore, Alternative E would not be as protective of GRSG as any of the other alternatives.

### ***Cumulative Effects***

Management actions associated with land uses and realty under Alternative E would not include specific exclusion or avoidance areas but would limit total disturbance within Occupied and Suitable Habitats and implement an avoid, minimize, mitigate approach, as discussed above. This would provide a lower level of certainty for Greater Sage-Grouse habitat protection under Alternative E than under alternatives that have fixed exclusion and avoidance areas based on habitat designations and could lead to greater habitat fragmentation under Alternative E. Therefore, the direct and indirect effects land uses and realty management under Alternative E, in conjunction with the past, present and reasonably foreseeable future actions, may result in the increased loss and fragmentation of the existing sagebrush habitat in Management Zones III, IV or V (refer to Chapter 5 of the DEIS).

## **Travel, Transportation and Recreation Management**

### ***Direct and Indirect Effects***

Under Alternative E, travel, transportation and recreation management would essentially remain the same as it currently is under Alternative A. Therefore, impacts to Greater Sage-Grouse under Alternative E are expected to be similar to those of Alternative A.

### ***Cumulative Effects***

Recreation is considered a “lesser threat” with respect to “relative cumulative actions” addressed in the DEIS and only for Management Zone V (see Chapter 5 of the DEIS). Current travel, transportation and recreation management as it exists under Alternative A would continue under Alternative E. The limitation of motorized travel to existing routes and permitting of recreational SUAs that are neutral or beneficial to sage-grouse, as well as limited opportunities for road construction and upgrading of current roads, would not be instituted as they would be in Alternatives B, C, D and F. Under Alternative E, the direct and indirect effects from travel, transportation and recreation management, in conjunction with the past, present and reasonably foreseeable future actions, may result in the increased loss and fragmentation of the existing sagebrush habitat in Management Zones III, IV and V (refer to Chapter 5 of the DEIS).

## Alternative F

### Vegetation and Soils

#### *Direct and Indirect Effects*

Unlike Alternative B, Alternative F includes a conservation measure specifically directed at invasive plants that would develop and implement methods for prioritizing and restoring sagebrush steppe invaded by nonnative plants. Like Alternative B, Alternative F would manage pinyon-juniper encroachment under current direction (see Alternative A). In addition, GRSG vegetation management conservation measures would benefit weed and conifer control efforts by prioritizing restoration efforts, including reducing invasive plants, and monitoring and controlling invasive species after fuels treatments and at existing new range improvements in all occupied GRSG habitat (PPH and PGH as opposed to only PPH under Alternative B). Together, these measures would reduce impacts from invasive plants and pinyon-juniper encroachment on GRSG habitat, as described under Alternative A, more so than Alternative B although the effects of the treatments would be the same.

#### *Cumulative Effects*

Under Alternative F, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), current vegetation and soils management treatments, including mechanical, manual, chemical, and biological control of invasive plants and pinyon and juniper, would continue and the short-term negative impacts of these activities on GRSG and GRSG habitats would continue to be outweighed by the long-term beneficial impacts including increased forage, cover quality and composition, reduced predator perches, decreased fire spread and intensity and potentially increased water availability. However, additional emphasis on protecting existing sagebrush habitat under Alternative F would provide an added benefit to GRSG habitat. Therefore, the direct and indirect effects of vegetation and soils management to Greater Sage-Grouse in Management Zones III, IV and V from the management actions under Alternative F, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to Greater Sage-Grouse.

### Livestock Grazing

#### *Direct and Indirect Effects*

Alternative F would include beneficial management actions similar to those of Alternative B except they would apply in all GRSG habitats. These include completion of Land Health Assessments, consideration of grazing methods and systems to reduce impacts on sage-grouse habitat, consideration of retiring vacant allotments, improved management of riparian areas and wet meadows, evaluation of existing introduced perennial grass seedings, authorization of new water developments and structural range improvements only when beneficial to GRSG, BMPs for West Nile Virus, and fence removal, modification or marking.. Together these efforts would reduce the impacts from grazing on GRSG described under Alternative A.

### ***Cumulative Effects***

Although livestock grazing occurs throughout all management zones, in the DEIS it is only considered a “lesser threat” with respect to “relative cumulative actions” and only for Management Zone V (see Chapter 5 of the DEIS). In addition, portions of Management Zone III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories which have the potential to compound the effects of livestock grazing on these lands; Forest Service-administered lands within Management zones IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); see Chapter 5 of the DEIS].

Under Alternative F, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), livestock grazing would continue to be managed through existing grazing plans Wild horse and burro Territories would be managed for Appropriate Management Level. However, additional emphasis on protecting existing sagebrush habitat under Alternative F would provide an added benefit to GRSG habitat. Therefore, the direct and indirect effects of livestock grazing and wild horse and burro management to Greater Sage-Grouse in Management Zones III, IV and V from the management actions under Alternative F, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to Greater Sage-Grouse.

### **Fire and Fuels**

#### ***Direct and Indirect Effects***

Fire and fuels management under Alternative F would essentially be the same as that under Alternative B. Please refer to Alternative B. The impacts on GRSG would be the same.

### ***Cumulative Effects***

The cumulative of management actions under Alternative F, when combined with the past, present and reasonably foreseeable future actions are similar to the cumulative effects described in Alternative B, and are not expected to be substantial, change the existing population trend, or remove and fragment sagebrush habitat past a critical threshold within Management Zones III, IV and V (refer to Chapter 5 of the DEIS).

### **Wild Horse and Burro Management**

#### ***Direct and Indirect Effects***

Wild horse and burro management under Alternative F would be similar to that proposed under Alternative B except all conservation measures, but the measure prioritizing gathers in PPH, would extend to all occupied GRSG habitat. Therefore, the beneficial impacts on GRSG under Alternative F would be the same as those under Alternative B except they would apply to all occupied GRSG habitat making Alternative F more protective of GRSG and GRSG habitat than Alternative B.

### *Cumulative Effects*

Refer to Alternative B. Cumulative effects would be the same.

## **Energy and Locatable Minerals Development**

### *Direct and Indirect Effects*

Energy and locatable minerals development is similar to proposed management under Alternative B. Under Alternative F siting of wind energy development would be prevented in PPH; PPH would be closed to new fluid mineral leasing, nonenergy leasable mineral leasing, and mineral material sales; it would be proposed for withdrawal from mineral entry; no new surface occupancy (NSO) would be stipulated for leased fluid minerals and a 3% disturbance cap would be applied. Numerous conservation measures would be implemented to reduce impacts from mineral exploration and development activities in PPH. Like Alternative B, Alternative F does not include specific management for locatable, or saleable or nonenergy minerals in PGH. Unlike Alternative B, Alternative F directly addresses wind energy and fluid minerals development outside of PPH: wind energy would be sited at least five miles from active sage-grouse leks and at least four miles from the perimeter of sage-grouse winter habitat and areas within 4 miles of active sage-grouse leks would be closed to new fluid minerals leasing. Alternative F, although similar to Alternative B, would reduce the impacts of energy development on GRS and GRS habitat, as described under Alternative A, more so than Alternative B because it addresses siting of wind energy and fluid minerals leasing outside of PPH more thoroughly than alternative B.

### *Cumulative Effects*

Energy development is currently a minor threat present only in Management Zone III but geothermal energy development potential is high throughout Management Zone IV (refer to Chapter 5 of the DEIS). Mining is common across Management Zones III and IV in Nevada and occurs at a variety of scales. Management actions associated with energy and locatable minerals development under Alternative B would increase protection of Greater Sage-Grouse habitat, primarily within PPH, thereby benefitting Greater Sage-Grouse rather than removing or fragmenting habitat. Under Alternatives B, within Management Zones III and IV, some of the current energy and locatable minerals management direction would continue, however, additional emphasis on protecting existing sagebrush habitat by adding all PPH to existing closures and proposing it for withdrawal would be included. Therefore, the direct and indirect effects of energy and locatable minerals development to Greater Sage-Grouse in Management Zones III, IV and V from the management actions under Alternative B, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to Greater Sage-Grouse.



## **Land Uses and Realty Management**

### ***Direct and Indirect Effects***

Land uses and realty management under Alternative F would essentially be the same as that under Alternative B. Please refer to Alternative B. The effects would be the same.

### ***Cumulative Effects***

Management actions associated with land uses and realty under Alternative F would increase protection of Greater Sage-Grouse habitat, thereby benefitting Greater Sage-Grouse rather than removing or fragmenting habitat. Under Alternative F, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), some of the current land and realty operations would continue, however, additional emphasis on protecting existing sagebrush habitat and preventing disturbance to GRSG would be included. Lands and realty management activities would focus ROW exclusion or avoidance areas in Greater Sage-Grouse habitat. Therefore, the direct and indirect effects of lands and realty management to Greater Sage-Grouse in Management Zones III, IV and V under Alternative F, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to Greater Sage-Grouse.

## **Travel, Transportation and Recreation Management**

### ***Direct and Indirect Effects***

With respect to travel, transportation and recreation, Alternative F is similar to Alternative B: within PPH, only recreational SUAs that are neutral or beneficial to GRSG would be permitted, there would be limited opportunities for new route construction and upgrading of existing routes could only occur if they would not result in a new route category (road, primitive road, or trail) or capacity, unless it is necessary for motorist safety, or eliminates the need to construct a new road. In addition, Alternative F would expand the Alternative B measure restricting motorized travel to designated routes in PPH to include PGH, designated routes in sage-grouse priority habitat would be considered for closure, camping areas within 4 miles of active leks would seasonally be closed, permanent seasonal road or area closures to protect breeding, nesting and brood rearing sage-grouse would be implemented and new road construction would be prohibited within 4 miles of active sage-grouse leks. Although the general recreational effects of Alternative F would be the same as those for Alternatives A and B, Alternative F would be more protective of GRSG and GRSG habitat, particularly with respect to reducing disturbance to GRSG and protecting sagebrush habitat from degradation and introduction of invasive weeds, than Alternative B due to the additional measures.

### ***Cumulative Effects***

Recreation is considered a “lesser threat” with respect to “relative cumulative actions” addressed in the DEIS and only for Management Zone V (see Chapter 5 of the DEIS). Management actions associated with travel, transportation and recreation under Alternative F would increase protection of Greater Sage-Grouse habitat within PPH and, in some instances, PGH and PPH,

thereby benefitting Greater Sage-Grouse rather than removing or fragmenting habitat. Under Alternative F, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), some of the current travel, transportation and recreation management direction would continue, however, additional emphasis on protecting existing sagebrush habitat would be included. Therefore, the direct and indirect effects of travel, transportation and recreation management to Greater Sage-Grouse in Management Zones III, IV and V under Alternative D, which would be largely beneficial for Greater Sage-Grouse, when combined with the past, present and reasonably foreseeable future actions, would not substantially increase impacts to Greater Sage-Grouse.

## **B. Sagebrush-Associated Species**

Bighorn sheep, pygmy rabbit, Columbia spotted bat and Townsend's big-eared bat have been grouped as Sagebrush-associated Species (SAS) for this analysis due to the similar habitats they occupy and the programmatic nature and landscape scale of this analysis. Though each of the species may not be completely dependent upon sagebrush for every life history stage, they are all strongly associated with sagebrush habitats. The landscape scale effects of the proposed conservation measures for each program area within each alternative will be analyzed generally and collectively for this group of species.

### **Bighorn sheep (*Ovis Canadensis*)**

#### ***Distribution***

The analysis area is outside of the range of the desert bighorn sheep, but within the range of the California and Rocky Mountain bighorn sheep. California bighorn sheep in Nevada are located primarily in the northwestern part of the state, mainly in Washoe and Humboldt counties, as well as in portions of western Elko, northern Lander, and Eureka counties. The state contains an estimated 1,800 animals (NDOW 2009). Although there are occasional sightings of individual juvenile male California bighorn sheep on the Jarbridge and Mountain City Ranger Districts of the Humboldt-Toiyabe National Forest, viable populations are restricted to the Santa Rosa Mountain Ranger District in the Northern Mountains Ecounit where they overlap the range of the Greater sage grouse. Within Nevada, Rocky Mountain bighorn sheep occur within the Badlands, and on Forest Service and other lands in the East Humboldt Range, and Ruby Mountains (Ruby Mountains ecounit) of Elko County, and in the northern portion of the Snake Range (Eastern Mountains ecounit), White Pine County (NDOW 2008).

#### ***Habitat Association and Threats***

Bighorn sheep occur in mesic to xeric, alpine to desert grasslands or shrub-steppe in mountains, foothills, or river canyons. Escape terrain (cliffs, talus slopes, etc.) is an important feature. Dense forests and chaparral that restrict vision are avoided. Bighorn sheep diets are diverse and variable. They are primarily grazers of grass and forbs, but diet can also include significant amounts of shrubs. Their diet changes seasonally. Populations other than those in low deserts



typically migrate between an alpine or montane summer range and a lower elevation winter range.

The primary threats for bighorn sheep is disease transmission from domestic livestock (permitted and private land inholdings) and predation by mountain lions. Competition from livestock, wildhorses and burros, and other large ungulates for water at spring sources, predation by mountain lion, energy development, such as oil, gas, and wind development, off-highway vehicle activity could disrupt bighorn sheep use of some habitat (NDOW 2005).

### **Pygmy Rabbit (*Brachylagus idahoensis*)**

#### ***Distribution***

In Nevada, the pygmy rabbit ranges primarily in the central and northern part of the state, corresponding to sagebrush distribution (NDOW 2005). There are records of pygmy rabbit on Santa Rosa and Mountain City Ranger Districts of the Humboldt-Toiyabe National Forest, along with the lower elevations of the Ruby Mountains and East Humboldt Mountains. Currently, the Santa Rosa District contains the largest population on the Forest. Extensive pygmy rabbit surveys on the Jarbidge Ranger District in 2009 found no suitable habitat due to the preponderance of volcanic, rocky soils.

#### ***Habitat Associations and Threats***

Typically found in dense stands of big sagebrush growing in deep loose soils (4,500 to 7,450 feet) in desert, shrubland, chaparral, sagebrush communities. Burrows measure three inches in diameter and may have three or more entrances. Big sagebrush is the primary food source; however, grasses and forbs are eaten in mid- to late-summer.

The primary cause for population declines is due to the loss, alteration, and fragmentation of sagebrush-steppe habitat because of factors such as increased fire frequency, extent, and severity, encroachment of habitat by invasive plant species, and vegetation treatments that remove sagebrush (NatureServe 2012, IDFG 2005). Fragmentation of sagebrush communities also poses a threat to populations of pygmy rabbits because dispersal potential is limited (NatureServe 2012).

### **Columbia spotted bat (*Euderma maculatum*)**

#### ***Distribution***

This species is known to occur from central Mexico, north to southern British Columbia, and east to Texas. Known from only twelve localities in Nevada, but distribution is scattered throughout Nevada. Distribution is patchy and linked to availability of cliff roosting habitat. Currently, the Humboldt-Toiyabe National Forest has no sighting information for Columbia spotted bats within the Northeastern Zone (Santa Rosa, Jarbridge, Mountain City, and Ruby Mountain Ranger Districts).

### ***Habitat Associations and Threats (Bradley et al. 2006)***

Found in various habitats from low elevation desert scrub to high-elevation coniferous forest habitats, including pinyon-juniper, sagebrush or riparian habitats. Closely associated with rocky cliffs. Current Nevada records indicate this species is distributed between 540 – 2,130 m (mean = 1,447m +/- 569m). Hibernates but periodically arouses to actively forage and drink in the winter. Characteristics of winter hibernacula in Nevada are completely unknown and poorly understood throughout the species range. Day roosts primarily in crevices in cliff faces. Diet includes a variety of insects but primarily consists of moths. In desert settings, foraging occurs in canyons, in the open, or over riparian vegetation.

The spotted bat is sensitive to human disturbance during roosting. Conservation and management issues include recreational climbing, water impoundments, grazing/meadow management, and mining and quarry operations.

### ***Townsend's big eared bat (Corynorhinus townsendii)***

#### ***Distribution***

Found throughout the state of Nevada from low desert to high mountain habitats. Distribution is strongly correlated with the availability of caves and abandoned mines (Bradley et al. 2006).

Townsend's big-eared bats have been observed across the Northeast Zone (Santa Rosa, Jarbridge, Mountain City, and Ruby Mountain Ranger Districts) of the Humboldt-Toiyabe National Forest.

#### ***Habitat Associations and Threats***

Townsend's big-eared bat is highly associated with caves and mines and found primarily in rural settings from deserts to lower, mid- to high-elevation mixed coniferous-deciduous forest.

Current Nevada records indicate this species is distributed between 210 – 3,500 m (mean = 1,720 m +/- 421 m) primarily in pinyon-juniper-mahogany, white fir, blackbrush, sagebrush, salt desert scrub, agricultural, and occasionally in urban habitats (Bradley et al. 2006).

Telemetry studies in northern Nevada have revealed over 95% of foraging activity to be concentrated in open forest habitats of pinyon, juniper, mahogany, white fir, aspen and cottonwood (Bradley 2000a in Bradley et al. 2006).

Primary threats consist of disturbance and destruction of roost sites. Other threats and conservation issues include recreational caving, closure of mines for reclamation, renewed mining, repeated surveys during hibernation and maternity seasons, water impoundments, loss of building roosts and bridge replacement.

## Alternative A - No Action

### Vegetation and Soils

#### *Direct and Indirect Effects*

As previously discussed for GRSG, invasive species such as cheatgrass or native species such as pinyon or juniper have replaced desirable dominant species in parts of the sub-region. Invasive plants are thought to alter plant community structure and composition, productivity, nutrient cycling, and hydrology, and may competitively exclude native plant populations. Cheatgrass competes with native grasses and forbs in sagebrush habitat. Invasive species cause direct degradation of sagebrush habitats including cover quality and composition, increased wildfire frequency and intensity (see Fire and Fuels discussion below) and are a particular threat to SAS species such as pygmy rabbit. As discussed below in Fire and Fuels, the encroachment of pinyon and juniper from higher elevations into sagebrush habitats can have a negative impact on sagebrush habitat. Although expansion of conifer woodlands threatens SAS species, such as pygmy rabbit, because they do not provide suitable habitat and trees displace shrubs, grasses and forbs, increase bare ground and the potential for erosion, and increase perch sites for raptors and raptor predation threats, pinyon and juniper woodland can provide structure for SAS species, such as bats, for nesting and roosting.

To reduce the likelihood of invasive weed spread and the extent of current infestations, integrated weed management techniques, including mechanical, manual, chemical, and biological control are utilized. Implementation of the above policies and plans would improve vegetation management by decreasing invasive species, provide for native vegetation establishment in sagebrush habitat, reduce the risk of wildfire, and restore fire-adapted ecosystems and repair lands damaged by fire. Mechanical juniper and pinyon pine treatments would result in short-term disturbances of soils and sagebrush due to heavy equipment, skid trails and temporary roads and remove habitat that could be utilized by SAS species such as bats. Although Townsend's big-eared bats tend to be associated with mines and caves, and Columbia spotted bats with crevices in cliff faces, much remains unknown about the roosting and hibernating habits of these species and conifer removal could eliminate a portion of this type of habitat or injure or kill individual bats that may be utilizing individual trees for these purposes. Mechanical and manual treatments would also increase noise, vehicular traffic and human presence. However, once the site potential is restored there would be an increase in forage, cover quality and composition and reduction in predator perches benefitting SAS species such as the pygmy rabbit. In addition, there would be a decrease in fire spread and intensity and a potential increase in water availability.

#### *Cumulative Effects*

Temporal and spatial boundaries used in the cumulative effects analysis for SAS are the same as those for Greater Sage-Grouse. The baseline date for the cumulative impacts analysis is 2012. The temporal scope of this analysis is a 20-year planning horizon; land use planning documents

are generally evaluated on a 5-year cycle. The temporal boundary for cumulative effects analysis for SAS includes Western Association of Fish and Wildlife Agencies (WAFWA) Management Zones III (Southern Great Basin), IV (Snake River Plain), and V (Northern Great Basin), which is large enough to encompass larger-ranging species, such as bighorn sheep.

Under Alternative A, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), current vegetation and soils management treatments, including mechanical, manual, chemical, and biological control of invasive plants and pinyon and juniper, would continue and the short-term negative impacts of these activities on SAS and SAS habitats would generally continue to be outweighed by the long-term beneficial impacts, including increased forage, cover quality and composition, reduced predator perches, decreased fire spread and intensity and potentially increased water availability. Therefore, the direct and indirect effects of vegetation and soils management to SAS in Management Zones III, IV and V from the management actions under Alternative A, which would be largely beneficial for SAS, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to SAS.

## **Livestock Grazing**

### ***Direct and Indirect Effects***

Depending upon site-specific management, beneficial or adverse impacts of grazing on SAS or their habitat would continue. Grazing practices can benefit SAS by reducing fuel load, protecting intact sagebrush habitat and increasing habitat extent and continuity. However, grazing at inappropriate intensity, season, or location may alter or degrade sagebrush ecosystems, or reduce cover and structure that could reduce the suitability of reproductive or foraging habitat. Grazing can degrade meadow/wetland/spring/stream habitat crucial riparian-dependent SAS such as bats. In addition, it can negatively impact SAS species, such as pygmy rabbits, through competition for forbs, soil compaction affecting burrows, disturbance of reproductive, foraging, or other critical behaviors, or temporary displacement, particularly during movement or trailing operations. Structural range improvements such as fences represent potential movement barriers or predator perches.

Under Alternative A, livestock grazing would continue to be managed through existing grazing plans, with methods and guidelines from the existing plans followed to maintain ecological conditions according to Standards for Rangeland Health, which include maintaining healthy, productive and diverse populations of native plants and animals. Riparian habitats would be managed to achieve standards. Range improvements would be designed to meet both wildlife and range objectives, and would include building or modifying fences to permit passage of wildlife and reduce the chance of bird strikes, use of off-site water facilities, and in some cases modification or removal or improvements not meeting resource needs. Modifications may involve moving troughs, adding or changing wildlife escape ramps, or ensuring water is available on the ground for a various different wildlife species. Although not directly created to

protect SAS, these approaches would protect and enhance SAS habitat by reducing the likelihood of the types of impacts described above.

### ***Cumulative Effects***

Although livestock grazing occurs throughout all management zones, in the DEIS it is only considered a “lesser threat” with respect to “relative cumulative actions” and only for Management Zone V (see Chapter 5 of the DEIS). In addition, portions of Management Zone III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories which have the potential to compound the effects of livestock grazing on these lands; Forest Service-administered lands within Management zones IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); see Chapter 5 of the DEIS].

Under Alternative A, within Management Zones III, IV and V, livestock grazing would continue to be managed through existing grazing plans, with methods and guidelines from the existing plans followed to maintain ecological conditions according to Standards for Rangeland Health, which include maintaining healthy, productive and diverse populations of native plants and animals. Wild horses and burro Territories would be managed for Appropriate Management Level (refer to Wild Horse and Burro Management section below) and healthy populations of wild horse and burros to achieve a thriving natural ecological balance with respect to wildlife, livestock use, and other multiple uses. Therefore, the direct and indirect effects of livestock grazing and wild horse and burro management to SAS in Management Zones III, IV and V from the management actions under Alternative A, which would be largely neutral for SAS, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to SAS.

## **Fire and Fuels**

### ***Direct and Indirect Effects***

Fire is particularly problematic in sagebrush systems because it kills sagebrush plants and, in some cases, re-burns before sagebrush has a chance to re-establish. Without fire, cheatgrass dominance can exclude sagebrush seedlings from establishing. With fire, areas can be converted to annual grasslands. Another factor affecting fire in some sagebrush sites is the encroachment of pinyon and juniper trees from higher elevations into sagebrush habitats. Under suitable conditions, wildfires that start in pinyon and juniper stands can move into Wyoming big sagebrush stands. In the absence of cheatgrass, Wyoming sagebrush sites can take 150 years to recover. Where cheatgrass is present, fire can open the site to invasion of annual grasses described above. The cheatgrass fire cycle causes sagebrush habitat loss and degradation on an annual basis. Currently, due to the extent of the threat, there are no management actions that can effectively alter this trend. Facilitation of the spread of cheatgrass and the likelihood of ignition through BLM and Forest Service-authorized programs is further discussed in the Lands and

Realty Management, Energy and Locatable Minerals Development and Travel, Transportation and Recreation sections.

Alternative A would continue to manage fire suppression and fuels management under current direction. Policies would not prioritize protection or restoration of mature sagebrush habitat. Under Alternative A, wildfires would likely continue to increase in size and frequency in sagebrush habitat and that habitat would subsequently continue to be degraded or lost. Additionally, there could be some direct and indirect effects to individuals of SAS, particularly bats that may be roosting in pinyon or juniper, from direct mortality or disturbance due to fire suppression or fuels treatment activities. Increased human activity and noise associated with wildland fire suppression or fuels treatments can disrupt nesting, breeding, or foraging behavior. Sagebrush habitat can be removed or degraded because of the use of heavy equipment or hand tools.

### ***Cumulative Effects***

Current wildfire suppression operations and fuels management activities would continue under Alternative A. The limitation or prohibition of the use of prescribed fire in sagebrush habitats, as well as, the sagebrush protection emphasis during wildland fire operations would not be instituted as they would be in Alternatives B, C, D, E and F. Under Alternative A, the direct and indirect effects, in conjunction with the past, present and reasonably foreseeable future actions and the likelihood of increasing future fires from annual weed invasions and predicted climate change, may result in the increased loss and fragmentation of the existing sagebrush habitat from wildfire in Management Zones III, IV and V.

### **Wild Horse and Burro Management**

#### ***Direct and Indirect Effects***

While not as widespread as livestock grazing, wild horse and burro management is still a major land use across the sagebrush biome. Equid grazing results in a reduction of shrub cover and more fragmented shrub canopies (Beever and Aldridge 2011). Additionally, sites grazed by free-roaming equids have a greater abundance of annual invasive grasses, reduced native plant diversity and reduced grass density (Beever and Aldridge 2011). Effects of wild equids on habitats may also be more pronounced during periods of drought or vegetation stress (NTT 2011, pg 18). The Wild and Free-Roaming Horses and Burros Act of 1971 requires that water must also be available yearlong in horse management areas. This often leads to riparian areas receiving yearlong use by horses or riparian areas being modified with additional fencing and troughs in order to accommodate yearlong horse use. Fences associated with wild horse and burro management represent potential movement barriers or predator perches for SAS species. Range improvements have the potential to increase perch sites, reduce water availability, and possibly negatively impact riparian habitat which could negatively impact pygmy rabbits or bats. According to Berger (1986), one measure of habitat quality for horses is the presence of meadows. Horse bands that spent more time foraging in meadows had higher reproductive



success and meadows received the highest use in proportion to their availability. At levels higher than Appropriate Management Level (AML), impacts can lead to loss of vegetative cover, decreased water quality, increased soil erosion, and reduced overall habitat quality for wildlife. In addition, wild horses and burros can compete with bighorn sheep for water at spring sources.

Within the Sub-region, all Forest Service districts manage for wild horses and/or burros within established Territories. Under current direction, overall direction is to manage for healthy populations of wild horse and burros to achieve a thriving natural ecological balance with respect to wildlife, livestock use, and other multiple uses. All Forest Service Territories are managed for AML. Initially, AML is established in LUPs at the outset of planning and is adjusted based on monitoring data throughout the life of the plan. Priorities for gathering horses to maintain AML are based on population inventories, gather schedules, and budget. Gathers are also conducted in emergency situations when the health of the population is at risk for lack of forage or water.

### ***Cumulative Effects***

Portions of Management Zone III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories; Forest Service-administered lands within Management zones IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); see Chapter 5 of the DEIS]. Although livestock grazing occurs throughout all management zones, and has the potential to compound the effects of wild horse and burro management on these lands, in the DEIS it is only considered a “lesser threat” with respect to “relative cumulative actions” and only for Management Zone V (see Chapter 5 of the DEIS).

Under Alternative A, within Management Zone III, wild horse and burro Territories would be managed for Appropriate Management Level (refer to Wild Horse and Burro Management section below) and healthy populations of wild horse and burros to achieve a thriving natural ecological balance with respect to wildlife, livestock use, and other multiple uses. Within Management Zones III, IV and V, livestock grazing would continue to be managed through existing grazing plans, with methods and guidelines from the existing plans followed to maintain ecological conditions according to Standards for Rangeland Health, which include maintaining healthy, productive and diverse populations of native plants and animals. Therefore, the direct and indirect effects of wild horse and burro management and livestock grazing to SAS in Management Zones III, IV and V from the management actions under Alternative A, which would be largely neutral for SAS, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to SAS or sagebrush habitat.

## **Energy and Locatable Minerals Development**

### ***Direct and Indirect Effects***

Under Alternative A, all energy and locatable minerals development and associated infrastructure, including power lines, roads, buildings, fences, wind turbines, solar panels, and others, would continue to be managed under current direction. As such, this alternative would be

expected to cause the greatest amount of direct and indirect impacts on SAS and their habitat including habitat loss, degradation, and fragmentation by roads, pipelines and power lines , disturbance of reproductive, foraging, or other critical behaviors, or displacement from increased levels of noise, presence of roads/humans and anthropogenic structures in an otherwise open landscape. Turbines associated with wind energy development would pose a greater collision hazard to bat species than under alternatives that would limit wind energy development.

### ***Cumulative Effects***

Energy development is currently a minor threat present only in Management Zone III but geothermal energy development potential is high throughout Management Zone IV (refer to Chapter 5 of the DEIS). Mining is common across Management Zones III and IV in Nevada and occurs at a variety of scales. Management under Alternative A would maintain the current acreage open to leasing of fluid minerals, without stipulations, and locatable mineral development, although areas closed to these activities under Alternative A include some existing ACEC designations, designated wilderness, and wilderness study areas. Current energy and minerals development activities would continue under Alternative A. The closure of areas to fluid minerals and other energy development and withdrawal of areas from mineral entry would not be instituted as they would be in Alternatives B, C, D and F. Therefore, under Alternative A, the direct and indirect effects of energy and locatable minerals development, in conjunction with the past, present and reasonably foreseeable future actions, may result in the increased loss and fragmentation of the existing sagebrush habitat from energy and locatable minerals development in Management Zones III, IV or V (refer to Chapter 5 of the DEIS).

## **Land Uses and Realty Management**

### ***Direct and Indirect Effects***

Under Alternative A, land tenure adjustments would be subject to current disposal/exchange/acquisition criteria, which include retaining lands with threatened or endangered species, high quality riparian habitat, or plant and animal populations or natural communities of high interest. This would reduce the likelihood of habitat conversion to agriculture, urbanization, or other uses that would remove sagebrush habitat. Existing land use plans direction would apply under Alternative A. There would be no changes to the current National Forest System infrastructure including power lines, wind turbines, communications towers, fences, or roads. Permitted ROWs would continue to allow construction, maintenance, and operation activities that could result in habitat loss, fragmentation, or degradation of sagebrush habitat or result in barriers to migration corridors or seasonal habitats. Construction and maintenance of infrastructure would continue to lead to higher short-term concentrations of human noise and disturbance that could cause disruption of reproductive, foraging, or other behaviors, abandonment of young, or temporary displacement of individuals. These activities could also lead to new infestations of noxious or invasive weeds and an increase in edge habitat. Existing and new power lines, wind turbines, communications towers, fences, and vehicles traveling on associated roads would continue to pose a collision hazard to SAS or to provide



potential perching and/or nesting habitat for avian predators. Though most projects would be forced to mitigate or minimize impacts, this alternative would likely have the greatest impact on SAS and their habitat.

### ***Cumulative Effects***

Current lands and realty (i.e., infrastructure) management activities would continue under Alternative A. ROW exclusion or avoidance areas would not be instituted as they would be in Alternatives B, C, D, or F. Therefore, under Alternative A, the direct and indirect effects of lands and realty management, in conjunction with the past, present and reasonably foreseeable future actions, may result in the increased loss and fragmentation of the existing sagebrush habitat and disturbance to SAS in Management Zones III, IV and V (refer to Chapter 5 of the DEIS).

## **Travel, Transportation and Recreation Management**

### ***Direct and Indirect Effects***

Under current management, travel on most Forest Service-administered lands is limited to designated roads, although off road motorized big game retrieval within ½ mile of roads is authorized on the Mountain City, Ruby Mountains, and Jarbidge Ranger Districts of the Humboldt-Toiyabe National Forest, with some restrictions.

Under Alternative A, there would be no changes to the current National Forest System Roads, transportation plan, or recreation management on these forests. There would be minimal seasonal restrictions on casual use and some of the areas within GRSG habitat would remain open to cross country travel. In general, the more acres and miles of routes that are designated in an area, the greater the likelihood of habitat fragmentation and introduction of invasive plants within sagebrush habitat and disturbance on SAS. In addition, less restrictive travel conditions usually mean higher concentrations of human use adjacent to motorized routes. This can cause disruption of breeding activities, abandonment of young, and temporary displacement. Impacts from roads may include habitat loss from road construction, noise disturbance from vehicles, and direct mortality from collisions with vehicles. Roads may also present barriers to migration corridors or seasonal habitats. Although the majority of cross country travel for big game retrieval would occur outside of the breeding season for SAS limiting the potential for OHV-related disturbance impacts to SAS, OHV use in these areas would still have the potential to fragment and introduce weeds into sagebrush habitat. This alternative has the highest potential to impact SAS due to the lack of restrictions on activities that cause these effects. Therefore all direct and indirect effects on the species and its habitat would likely cause current trends to continue.

### ***Cumulative Effects***

Recreation is considered a “lesser threat” with respect to “relative cumulative actions” addressed in the DEIS and only for Management Zone V (see Chapter 5 of the DEIS). Current travel, transportation and recreation management would continue under Alternative A. The limitation of motorized travel to existing routes and permitting of recreational SUAs that are neutral or beneficial to sage-grouse, as well as limited opportunities for road construction and upgrading of

current roads, would not be instituted as they would be in Alternatives B, C, D and F. Under Alternative A, the direct and indirect effects from travel, transportation and recreation management, in conjunction with the past, present and reasonably foreseeable future actions, may result in the increased loss and fragmentation of the existing sagebrush habitat in Management Zones III, IV and V (refer to Chapter 5 of the DEIS).

## **Alternative B**

### **Vegetation and Soils**

#### ***Direct and Indirect Effects***

Under Alternative B, weed control efforts and pinyon-juniper encroachment would continue to be managed under current direction (see Alternative A). However, vegetation management conservation measures would benefit weed control efforts by prioritizing restoration efforts, including reducing invasive plants and, in turn, benefit SAS species, such as pygmy rabbit, negatively impacted by invasive species. BLM and Forest Service would require the use of native seeds and would design post-restoration management to ensure the long-term persistence of the restoration efforts, and would consider changes in climate when determining species for restoration. Invasive species would also be monitored and controlled after fuels treatments and at existing range improvements. Alternative B incorporates fewer invasive plant management measures in PGH compared to PPH. However, many of the same habitat restoration and vegetation management actions would be applied, including prioritizing the use of native seeds. Together, these measures would reduce impacts to SAS from invasive plants described under Alternative A although the effects of the treatments would be the same.

#### ***Cumulative Effects***

Under Alternative B, within Management Zones III, IV and V, current vegetation and soils management treatments, including mechanical, manual, chemical, and biological control of invasive plants and pinyon and juniper, would continue and the short-term negative impacts of these activities on SAS and SAS habitats would continue to be outweighed by the long-term beneficial impacts including increased forage, cover quality and composition, reduced predator perches, decreased fire spread and intensity and, potentially, increased water availability. However, additional emphasis on protecting existing sagebrush habitat, under Alternative B would provide an added benefit to sagebrush habitat. Therefore, the direct and indirect effects of vegetation and soils management to SAS in Management Zones III, IV and V from the management actions under Alternative B, which would be largely beneficial for SAS, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to SAS or sagebrush habitat.

## **Livestock Grazing**

### ***Direct and Indirect Effects***

Alternative B would implement a number of beneficial management actions in PPH to incorporate sage-grouse habitat objectives and management considerations into livestock grazing management. These include completion of Land Health Assessments, consideration of grazing methods and systems to reduce impacts on sagebrush habitat, consideration of retiring vacant allotments, improved management of riparian areas and wet meadows, evaluation of existing introduced perennial grass seedings, authorization of new water developments and structural range improvements only when beneficial to GRSG, BMPs for West Nile Virus, and fence removal, modification or marking. Several management actions to reduce impacts from livestock grazing on sage-grouse general habitat would be incorporated, including the potential to modify grazing systems to meet seasonal sage-grouse habitat requirements and management to improve the conditions of riparian areas and wet meadows, which would benefit sagebrush-associated bat species in particular. Together these efforts would reduce the negative grazing-related impacts on SAS described under Alternative A.

### ***Cumulative Effects***

Although livestock grazing occurs throughout all management zones, in the DEIS it is only considered a “lesser threat” with respect to “relative cumulative actions” and only for Management Zone V (see Chapter 5 of the DEIS). In addition, portions of Management Zone III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories which have the potential to compound the effects of livestock grazing on these lands. Forest Service-administered lands within Management zones IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); see Chapter 5 of the DEIS].

Under Alternative B, within Management Zones III, IV and V, livestock grazing would continue to be managed through existing grazing plans and wild horse and burro Territories would be managed for Appropriate Management Level. However, additional emphasis on protecting existing sagebrush habitat under Alternative B would provide an added benefit to SAS habitat. Therefore, the direct and indirect effects of livestock grazing and wild horse and burro management to SAS in Management Zones III, IV and V from the management actions under Alternatives B, which would be largely beneficial for SAS, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to SAS or their habitat.

## **Fire and Fuels**

### ***Direct and Indirect Effects***

Under Alternative B, suppression would be prioritized in PPH to protect mature sagebrush habitat. Suppression would be prioritized in PGH only where fires threaten PPH. Suppression-related juniper encroachment discussed under Alternative A could increase in some areas under

Alternative B, eliminating habitat for SAS, such as the pygmy rabbit, and eventually resulting in heavy fuel loadings that could contribute to larger-scale wildfire events that have a particularly negative effect on the pygmy rabbit. However, suppression could benefit SAS, such as bats, by protecting juniper and pinyon that may be used as roosts or hibernacula.

Alternative B does not include any other specific management for wildland fire management in PGH. Fuels treatments would be designed to protect sagebrush ecosystems by maintaining sagebrush cover, implementing fuel breaks, applying seasonal restrictions, protections for winter range, and requiring use of native seeds. Post-fuels treatments would be designed to ensure long-term persistence of seeded areas and native plants and maintain 15 percent canopy cover. Fuels treatments would also monitor and control for invasive species, and fuels management BMPs would incorporate invasive plant prevention measures. These measures would benefit SAS species negatively impacted by invasive species, such as pygmy rabbit, by eliminating competition with or exclusion of forage species. Overall, these conservation measures would reduce the threat of wildfire to sagebrush compared to Alternative A although the general effects of fire suppression and fuels treatments would be similar to those of Alternative A.

### ***Cumulative Effects***

Management actions under Alternative B, with respect to fire and fuels, would increase protection of sagebrush habitat, primarily within PPH, thereby benefitting SAS rather than removing or fragmenting habitat. Under Alternative B, within Management Zones III, IV and V, current wildfire suppression operations would continue, however, additional emphasis on protecting existing sagebrush habitat during suppression activities and pre-suppression planning and staging for maximum protection of Greater Sage-Grouse habitat would be included. Fuels treatment activities would focus on protecting Greater Sage-Grouse habitat, primarily within PPH. Therefore, the direct and indirect effects of fire to SAS in Management Zones III, IV and V from the management actions under Alternative B, which would be largely beneficial for SAS, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to SAS or their habitat.

### **Wild Horse and Burro Management**

#### ***Direct and Indirect Effects***

Under Alternative B, wild horses and burros would be managed at AML on the same number of acres as Alternative A, with gathers prioritized based on PPH habitat and emergency environmental issues. Wild Horse Territory (WHT) Plans would incorporate GRSG habitat objectives in PPH. Land health assessments to determine existing structure/condition/composition of vegetation within all Territories would be conducted. Implementation of any range improvements in PPH would follow the same guidance as identified for livestock grazing in this alternative including designing and locating new improvements only where they “conserve, enhance, or restore GRSG habitat through improved grazing management”. Design features could include treating invasive species associated with

range improvements. Additional range improvements in PPH would specifically address the needs of GRSG. In comparison to Alternative A, Alternative B would prioritize GRSG habitat objectives in WHT Plans and base AML numbers on GRSG habitat needs which would also likely benefit sagebrush-associated species by reducing the types of wild horse and burro management-related impacts discussed under Alternative A.

### ***Cumulative Effects***

Portions of Management Zone III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories. Forest Service-administered lands within Management zones IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); see Chapter 5 of the DEIS]. Although livestock grazing occurs throughout all management zones, and has the potential to compound the effects of livestock grazing on these lands, in the DEIS it is only considered a “lesser threat” with respect to “relative cumulative actions” and only for Management Zone V (see Chapter 5 of the DEIS).

Under Alternative B, within Management Zones III, IV and V, wild horse and burro Territories would continue to be managed for Appropriate Management Level and livestock grazing would continue to be managed through existing grazing plans. However, additional emphasis on protecting existing sagebrush habitat under Alternative B would provide an added benefit to sagebrush habitat. Therefore, the direct and indirect effects of livestock grazing and wild horse and burro management to SAS in Management Zones III, IV or V from the management actions under Alternative B, which would be largely beneficial for SAS, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to SAS or their habitat.

## **Energy and Locatable Minerals Development**

### ***Direct and Indirect Effects***

Under this Alternative, PPH would be closed to new fluid mineral leasing, nonenergy leasable mineral leasing, and mineral material sales, and it would be proposed for withdrawal from mineral entry. In addition, mandatory BMPs would be applied as conditions of approval on fluid mineral leases. No surface occupancy (NSO) would be stipulated for leased fluid minerals within PPH. A 3% disturbance cap to activities in PPH would be applied and numerous conservation measures would be implemented to reduce impacts from mineral exploration and development activities in PPH. These measures would reduce the impacts of energy development described under Alternative A on SAS within PPH.

Alternative B does not include specific management for fluid, saleable, locatable, and nonenergy leasable minerals in PGH or wind energy or solar energy development in PPH or PGH. As a result, current trends would continue and impacts would be similar to those under Alternative A. Although Alternative B does not directly address wind energy development or industrial solar development, its 3% threshold for anthropogenic disturbances (See Land Uses and Realty

Management) would apply to energy development and would limit the extent of all types of energy development in PPH. These measures would reduce the impacts of energy development on SAS described under Alternative A, although turbines associated with wind energy development would pose a greater collision hazard to bat species than under alternatives that would limit wind energy development through avoidance or exclusion.

### ***Cumulative Effects***

Energy development is currently a minor threat present only in Management Zone III but geothermal energy development potential is high throughout Management Zone IV (refer to Chapter 5 of the DEIS). Mining is common across Management Zones III and IV in Nevada and occurs at a variety of scales. Management actions associated with energy and locatable minerals development under Alternative B would increase protection of sagebrush habitat, primarily within PPH, thereby benefitting SAS rather than removing or fragmenting habitat. Under Alternative B, within Management Zones III and IV, some of the current energy and locatable minerals management direction would continue, however, additional emphasis on protecting existing sagebrush habitat by adding all PPH to existing closures and proposing it for withdrawal would be included. Therefore, the direct and indirect effects of to SAS in Management Zones III, IV and V from the management actions associated with energy and locatable minerals development under Alternative B, which would be largely beneficial for SAS, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to SAS.

## **Land Uses and Realty Management**

### ***Direct and Indirect Effects***

Under this alternative, all PPH would be managed as exclusion areas and PGH would be managed as an avoidance area for new ROW and SUA projects and co-location of new ROWs or SUAs with existing infrastructure would occur in PPH and PGH. It would also include the following within PPH: co-location of new ROWs or SUAs with existing infrastructure; removal, burying, or modification of existing power lines; co-location of new facilities with existing facilities, where possible; use of existing roads, or realignments to access valid existing rights that are not yet developed or constructing new roads to the absolute minimum standard necessary if valid existing rights could not be accessed via existing roads; and a 3% threshold on anthropogenic disturbance (including, but not limited to, highways, roads, geothermal wells, wind turbines, and associated facilities) within PPH.

In addition, Alternative B would contain provisions to retain public ownership of priority sage-grouse habitat and to acquire state and private lands with intact subsurface mineral estate where suitable conservation actions for GRSG could not otherwise be achieved. This alternative would benefit SAS by maximizing connectivity and minimizing loss, fragmentation, degradation and disturbance of sagebrush habitats within PPH by power lines, communication towers and roads. SAS and SAS habitat outside PPH would likely experience little change in direct or indirect



effects. However, if the 3% development threshold ended up concentrating new infrastructure development outside PPH rather than just reducing it within PPH, the extent of impacts on SAS and SAS habitat outside PPH could increase under Alternative B relative to Alternative A. Alternative B would reduce the likelihood of collisions addressed in Alternative A. These conservation measures make this alternative more protective of SAS than Alternative A, although the general effects would be the same.

### ***Cumulative Effects***

Management actions associated with lands and realty under Alternatives B would increase protection of sagebrush habitat, thereby benefitting SAS rather than removing or fragmenting habitat. Under Alternative B, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), some of the current land and realty operations would continue, however, additional emphasis on protecting existing sagebrush habitat and preventing disturbance to GRSG would be included. Lands and realty management activities would focus ROW exclusion or avoidance areas in Greater Sage-Grouse habitat. Therefore, the direct and indirect effects of lands and realty management to SAS in Management Zones III, IV and V under Alternative B, which would be largely beneficial for SAS, when combined with the past, present and reasonably foreseeable future actions, would not substantially increase impacts to SAS.

## **Travel, Transportation and Recreation Management**

### ***Direct and Indirect Effects***

Under Alternative B, motorized travel in PPH would be limited to designated roads, primitive roads, and trails. Only recreational SUAs that are neutral or beneficial to sage-grouse would be permitted in PPH and there would be limited opportunities for road construction in PPH, with minimum standards applied and no upgrading of current roads. Although general impacts would be the same as Alternative A, Alternative B is more restrictive than Alternative A and it would likely reduce loss and fragmentation of SAS habitat and disturbance to SAS in PPH by minimizing human use and road construction or upgrades, and reduce the potential for automotive collisions with individuals of SAS species within PPH. However, if these measures ended up concentrating recreational use and additional roads outside PPH rather than just reducing it within PPH, the extent of impacts on SAS outside PPH could increase under Alternative B relative to Alternative A.

### ***Cumulative Effects***

Recreation is considered a “lesser threat” with respect to “relative cumulative actions” addressed in the DEIS and only for Management Zone V (see Chapter 5 of the DEIS). Management actions associated with travel, transportation and recreation under Alternative B would increase protection of sagebrush habitat, primarily within PPH, thereby benefitting SAS rather than removing or fragmenting habitat. Under Alternative B, within Management Zones III, IV and V, some of the current travel, transportation and recreation management direction would continue, however, additional emphasis on protecting existing sagebrush habitat would be included.

Therefore, the direct and indirect effects of travel, transportation and recreation management to SAS in Management Zones III, IV and V under Alternative B, which would be largely beneficial for SAS, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to SAS.

## **Alternative C**

### **Vegetation and Soils**

#### ***Direct and Indirect Effects***

Alternative C would maintain the direction described under Alternative A for weed control and pinyon-juniper encroachment and include additional provisions that would limit invasive weed spread in all occupied GRSG habitat. Vegetation management would benefit weed control efforts, by prioritizing restoration, including reducing invasive plants, in order to benefit sage-grouse habitats. In all cases, local native plant ecotype seeds and seedlings would be used. These policies would reduce the impacts of invasive plants on SAS described under Alternative A and have similar impacts associated with treatment, but would include additional conservation measures specific to limiting the spread of invasive plants. In addition, grazing would be eliminated within all occupied sage-grouse habitat, eliminating the potential for invasive plant spread by livestock. This would generally make Alternative C more protective of SAS and SAS habitat than Alternatives A or B.

#### ***Cumulative Effects***

Under Alternative C, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), current vegetation and soils management treatments, including mechanical, manual, chemical, and biological control of invasive plants and pinyon and juniper, would continue and the short-term negative impacts of these activities on SAS and sagebrush habitat would continue to be outweighed by the long-term beneficial impacts including increased forage, cover quality and composition, reduced predator perches, decreased fire spread and intensity and potentially increased water availability. However, additional emphasis on protecting existing sagebrush habitat under Alternative C would provide an added benefit to sagebrush habitat. Therefore, the direct and indirect effects of vegetation and soils management to SAS in Management Zones III, IV and V from the management actions under Alternative C, which would be largely beneficial for SAS, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to SAS or their habitat.

### **Livestock Grazing**

#### ***Direct and Indirect Effects***

Under Alternative C, grazing would be eliminated within all occupied sage-grouse habitat reducing both the negative and positive grazing-related impacts on SAS and SAS habitat discussed under Alternative A more so than any of the other alternatives. No new water developments or range improvements would be constructed in occupied habitat and only habitat



treatments that benefit GRSG would be allowed; most habitat treatments would be expected to benefit SAS as well. Retirement of grazing would be allowed and fast tracked. Alternative C could negatively impact SAS species by eliminating artificial water developments that some of these species have come to rely upon once grazing is eliminated, but it could improve riparian conditions. It would eliminate the potential for disease transmission from domestic livestock to bighorn sheep or the potential for competition between livestock and bighorn sheep at spring sources within all occupied habitat.

### ***Cumulative Effects***

Although livestock grazing occurs throughout all management zones, in the DEIS it is only considered a “lesser threat” with respect to “relative cumulative actions” and only for Management Zone V (see Chapter 5 of the DEIS). Under Alternative C, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), livestock grazing would be eliminated within all occupied GRSG habitat, providing a net benefit to sagebrush habitat. Therefore, the direct and indirect effects of livestock grazing to SAS in Management Zones III, IV and V from management under Alternative C, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to SAS or sagebrush habitat.

## **Fire and Fuels**

### ***Direct and Indirect Effects***

Alternative C is similar to Alternative B except that it is more protective of SAS and SAS habitat because prioritization of suppression would apply to All Occupied Habitat, it includes measures to manage vegetation for good or better ecological condition, and it focuses fuel breaks on areas of human habitation or significant disturbance. Some of the negative impacts of fire suppression on conifer encroachment and fire suppression and fuels treatments on SAS discussed under Alternative A would be offset by the prioritization of restoration treatments described below for invasive plants. The general effects of fire suppression and fuels treatments would be similar to those of Alternative A.

### ***Cumulative Effects***

The cumulative effect of management actions related to fire and fuels under Alternative C, when combined with the past, present and reasonably foreseeable future actions are similar to the cumulative effects described in Alternative B, and are not expected to be substantial or remove or fragment sagebrush habitat past a critical threshold within Management Zones III, IV and V (refer to Chapter 5 of the DEIS).

## **Wild Horse and Burro Management**

### ***Direct and Indirect Effects***

Under Alternative C, wild horses and burros would be managed at AML. However, AML establishment would be analyzed in conjunction with livestock numbers during grazing permit renewals. Combined with the removal of some fences during “active restoration” processes

related to livestock grazing, horses and burros would be expected to range over a larger area than in Alternative A and would necessitate the need for increased gather schedules. The increase in access to riparian and upland habitats that are currently protected by fences, and expected temporary increases in horses and burros over AML, could reduce food and cover for SAS, degrade riparian habitat important to bat species or increase the potential for competition between wild horses and burros and bighorn sheep at spring sources.

### ***Cumulative Effects***

Portions of Management Zone III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories. Forest Service-administered lands within Management zones IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); see Chapter 5 of the DEIS]. Under Alternative C, wild horse and burro Territories would be managed for AML as under current management, however, there would be fewer restrictions on wild horse and burro movement than under Alternative A. Therefore, the direct and indirect effects of wild horse and burro management under Alternative C, in conjunction with the past, present and reasonably foreseeable future actions, may result in the increased loss and fragmentation of the existing sagebrush habitat in Management Zones III, IV and V (refer to Chapter 5 of the DEIS).

## **Energy and Locatable Minerals Development**

### ***Direct and Indirect Effects***

Alternative C would expand several of the protections under Alternative B to all occupied habitat as well as prohibit new exploration permits for unleased fluid minerals (also see Land Uses and Realty Management below). Like Alternative B, the conservation measures proposed under Alternative C would reduce the impacts of energy and locatable minerals development on SAS described under Alternative A, but to a larger degree than any of the other alternatives.

### ***Cumulative Effects***

Energy development is currently a minor threat present only in Management Zone III but geothermal energy development potential is high throughout Management Zone IV (refer to Chapter 5 of the DEIS). Mining is common across Management Zones III and IV in Nevada and occurs at a variety of scales. Management actions under Alternative C with regard to energy and locatable minerals development would increase protection of all occupied habitat, thereby benefitting SAS. Under Alternative C, within Management Zones III and IV, some of the current energy and locatable minerals management direction would continue, however, additional emphasis on protecting existing sagebrush habitat by adding all occupied habitat to existing closures and proposing it for withdrawal would be included. Therefore, the direct and indirect effects of fire to SAS Zones III, IV and V from the management actions under Alternative C, which would be largely beneficial for SAS, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to SAS or SAS habitat.

## **Land Uses and Realty Management**

### ***Direct and Indirect Effects***

Alternative C would have the most protective GRSG conservation measures with respect to SAS and infrastructure. Alternative C would extend many of the Alternative B conservation measures to all occupied habitat and all occupied habitat would be managed as an exclusion area for new ROW projects. As a result, management under Alternative C would encourage consolidation of sage-grouse habitats, facilitating habitat conservation and management and reduce the impacts of infrastructure on SAS described under Alternatives A and B in a wider area than Alternative B. Unlike Alternative B, which would permit wind energy siting in PPH provided a development disturbance threshold of 3% were not exceeded, Alternative C would not permit wind energy development siting in all occupied GRSG habitat. This would reduce the effects of wind energy on SAS discussed under Alternative A more so than Alternative B. Like alternative B, Alternative C would aim to remove, bury, or modify existing power lines but would apply to all occupied GRSG habitat, having the potential to disturb more SAS and habitat in the short term but, perhaps, having a greater likelihood of reducing the potential for collisions with aerial species in the long term. This alternative would be expected to have the least negative impacts and most positive impacts to wildlife species whose ranges overlap with all occupied GRSG habitat.

### ***Cumulative Effects***

Management actions associated with lands and realty under Alternative C would increase protection of Greater Sage-Grouse habitat, thereby benefitting SAS rather than removing or fragmenting habitat. Under Alternative C, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), some of the current land and realty operations would continue, however, additional emphasis on protecting existing sagebrush habitat and preventing disturbance to GRSG would be included. Lands and realty management activities would focus ROW exclusion or avoidance areas in Greater Sage-Grouse habitat. Therefore, the direct and indirect effects of lands and realty management to SAS in Management Zones III, IV and V under Alternative C, which would be largely beneficial for SAS, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to SAS or SAS habitat.

## **Travel, Transportation and Recreation Management**

### ***Direct and Indirect Effects***

Alternative C is similar to Alternative B except that it would apply to all occupied habitat and, therefore, protect a larger area of SAS habitat than Alternative B from the same types of general recreational impacts described in Alternative A.

### ***Cumulative Effects***

Recreation is considered a “lesser threat” with respect to “relative cumulative actions” addressed in the DEIS and only for Management Zone V (see Chapter 5 of the DEIS). Management actions associated with travel, transportation and recreation under Alternative C would increase

protection of all occupied Greater Sage-Grouse habitat, thereby benefitting SAS rather than removing or fragmenting habitat. Under Alternative C, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), some of the current travel, transportation and recreation management direction would continue, however, additional emphasis on protecting existing sagebrush habitat would be included. Therefore, the direct and indirect effects of travel, transportation and recreation management to SAS in Management Zones III, IV and V under Alternative C, which would be largely beneficial for SAS, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to SAS or sagebrush habitat.

## **Alternative D**

### **Vegetation and Soils**

#### ***Direct and Indirect Effects***

Alternative D would treat sites within priority and general sage-grouse habitat that are dominated by invasive species through an IVM approach using fire, chemical, mechanical and biological methods based on site potential. Targeted grazing would be allowed to suppress cheatgrass or other vegetation that are hindering achieving sage-grouse objectives in priority and general habitat. Sheep, cattle, or goats may be used as long as the animals are intensely managed and removed when the utilization of desirable species reaches 35%. In perennial grass, invasive annual grass, and conifer-invaded cover types, sagebrush steppe would be restored with sagebrush seedlings where feasible.

Pinyon and juniper treatment in encroached sagebrush vegetation communities in priority habitat and general habitat would focus on enhancing, reestablishing, or maintaining habitat components (e.g. cover, security, food, etc.) in order to achieve habitat objectives. Phase II and III pinyon and/or juniper stands would be removed or reduced in biomass to meet fuel and sage-grouse habitat objectives and appropriate action would be taken to establish desired understory species composition, including seeding and invasive species treatments. Treatment methods that maintain sagebrush and shrub cover and composition would be used in areas with a sagebrush component. More so than Alternatives A, B or C, Alternative D has the potential to negatively impact bat species, through roost/hibernacula removal or injury or death, from more targeted pinyon and juniper removal. Although species negatively impacted by conifer encroachment, such as pygmy rabbit, would likely benefit more so than under Alternatives A, B or C. Use of domestic sheep for targeted grazing has the potential to negatively impact bighorn sheep through disease transmission. Short-term disturbance-related impacts to SAS from treatments would be the same under Alternative D as under Alternative A as would the general long-term benefits.

#### ***Cumulative Effects***

Under Alternative D, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), current vegetation and soils management treatments, including mechanical, manual, chemical, and biological control of invasive plants and pinyon and juniper, would continue and the short-

term negative impacts of these activities on SAS and SAS habitats would continue to be outweighed by the long-term beneficial impacts including increased forage, cover quality and composition, reduced predator perches, decreased fire spread and intensity and potentially increased water availability. However, additional emphasis on protecting existing sagebrush habitat under Alternative D would provide an added benefit to sagebrush habitat. Therefore, the direct and indirect effects of vegetation and soils management to SAS in Management Zones III, IV and V from the management actions under Alternative D, which would be largely beneficial for SAS, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to SAS or SAS habitat.

## **Livestock Grazing**

### ***Direct and Indirect Effects***

Alternative D, similar to Alternative B, would implement a number of beneficial management actions to incorporate sage-grouse habitat objectives and management considerations into livestock grazing management: consideration of grazing methods and systems to reduce impacts on sage-grouse habitat, consideration of retiring vacant allotments, improved management of riparian areas and wet meadows, evaluation of existing introduced perennial grass seedings, authorization of new water developments and structural range improvements only when beneficial to GRSG, the potential to modify grazing systems to meet seasonal sage-grouse habitat requirements and fence removal, modification or marking. The main difference is that Alternative D would apply these conservation measures to priority and general habitat rather than limiting them to PPH as Alternative B would and Alternative D would not require the completion of Land Health Assessments to determine if standards of range-land health are being met as Alternative B would. These measures would reduce potential for negative impacts from grazing on SAS described under Alternative A probably more so than Alternative B but less so than Alternative C that would eliminate livestock grazing in all occupied habitat. Alternative D would benefit riparian-dependent SAS, such as Columbia spotted bat, by improving riparian conditions.

### ***Cumulative Effects***

Although livestock grazing occurs throughout all management zones, in the DEIS it is only considered a “lesser threat” with respect to “relative cumulative actions” and only for Management Zone V (see Chapter 5 of the DEIS). In addition, portions of Management Zone III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories which have the potential to compound the effects of livestock grazing on these lands; Forest Service-administered lands within Management zones IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); see Chapter 5 of the DEIS].

Under Alternative D, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), livestock grazing would continue to be managed through existing grazing plans and wild horse

and burro Territories would be managed for Appropriate Management Level. However, additional emphasis on protecting existing sagebrush habitat under Alternative D would provide an added benefit to sagebrush habitat. Therefore, the direct and indirect effects of livestock grazing and wild horse and burro management to SAS in Management Zones III, IV and V from the management actions under Alternative D, which would be largely beneficial for SAS, when combined with the past, present and reasonably foreseeable future actions, would not substantially increase impacts to SAS or sagebrush habitat.

## **Fire and Fuels**

### ***Direct and Indirect Effects***

Unlike Alternative B, in which suppression would be prioritized in PPH, but only in PGH where fires threaten PPH, Alternative D would prioritize suppression in priority and general sage-grouse habitat. In priority and general habitat, fuels treatments emphasizing maintaining, protecting, and expanding GRSG habitat would be designed and implemented and would include measures similar to Alternative B except they would apply to priority and general habitat rather than only PPH. These include generally enhancing or maintaining/retaining sagebrush canopy cover and community structure; applying appropriate seasonal restrictions for implementing fuels treatments according to the type of sage-grouse seasonal habitats present; and requiring use of native seeds for fuels management treatment based on availability, adaptation (site potential), and probability of success. In addition, Alternative D would not allow fuels treatment projects to be implemented in priority and general habitat if it is determined the treatment would not be beneficial to GRSG or its habitat. It would identify opportunities for prescribed fire and require use of certified weed-free seeds. Alternative D would prioritize pre-suppression activities in sage-grouse habitats that are vulnerable to wildfire events and post-fire treatments in priority and general habitat to maximize benefits to greater sage-grouse. Overall, these conservation measures would reduce the threat of wildfire to sagebrush compared to Alternative A, although in general, the effects of fire suppression and fuels treatments would be similar to those of Alternative A. Prioritization of suppression and fuels treatments in priority and general habitat under Alternative D, rather than limiting them to PPH under Alternative B, would make Alternative D more protective of SAS and sagebrush habitat, in the long term, than Alternative B.

### ***Cumulative Effects***

The cumulative effect of management actions under Alternative D, when combined with the past, present and reasonably foreseeable future actions are similar to the cumulative effects described in Alternative B, and are not expected to be substantial or remove or fragment sagebrush habitat past a critical threshold within Management Zones III, IV and V (refer to Chapter 5 of the DEIS).



## **Wild Horse and Burro Management**

### ***Direct and Indirect Effects***

Under Alternative D, gathers would be prioritized in priority and general habitat as opposed to only PPH under Alternative B. Otherwise Alternative B is similar to management proposed in Alternative B in that wild horse and burro populations would be managed within established AML to meet sage-grouse habitat objectives for all WHTs within or containing priority or general habitat. Unlike Alternative B, adjustments to AML through the NEPA process would be considered in WHTs not meeting standards due to degradation that can be at least partially contributed to wild horse or burro populations; adjustments would be based on monitoring data and would seek to protect and enhance priority and general habitat and establish a thriving ecological balance. Alternative D would be expected to reduce the impacts of wild horses and burros on SAS described under Alternative A over a larger area than Alternative B.

### ***Cumulative Effects***

Portions of Management Zone III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories. Forest Service-administered lands within Management zones IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); see Chapter 5 of the DEIS]. Although livestock grazing occurs throughout all management zones, and has the potential to compound the effects of livestock grazing on these lands, in the DEIS it is only considered a “lesser threat” with respect to “relative cumulative actions” and only for Management Zone V (see Chapter 5 of the DEIS).

Under Alternative D, within Management Zones III, IV and V, wild horse and burro Territories would be managed for Appropriate Management Level and livestock grazing would continue to be managed through existing grazing plans. However, additional emphasis on protecting existing sagebrush habitat under Alternative D would provide an added benefit to sagebrush habitat. Therefore, the direct and indirect effects of livestock grazing and wild horse and burro management to SAS in Management Zones III, IV and V from the management actions under Alternative D, which would be largely beneficial SAS, when combined with the past, present and reasonably foreseeable future actions, would not substantially increase impacts on SAS or their habitat.

## **Energy and Locatable Minerals Development**

### ***Direct and Indirect Effects***

Under Alternative D, a NSO stipulation, with no allowance for waivers, exceptions, or modifications, would be applied to un-leased federal fluid mineral estate in priority sage-grouse habitat and a NSO stipulation, with allowance for waivers, exception, or modifications, would be applied in un-leased federal fluid mineral estate in general sage-grouse habitat. Geophysical exploration that does not result in crushing of sagebrush vegetation or create new or additional surface disturbance would be allowed within priority and general sage-grouse habitat, but

geophysical operations would be subject to timing and controlled surface use limitations. Proposed surface disturbance in unleased priority habitat must achieve no net unmitigated loss of priority habitat; seasonal restrictions on exploratory drilling that prohibit surface-disturbing activities in winter habitat and during the lekking, nesting, and early brood-rearing season would be applied in all priority sage-grouse habitat. Required Design Features (RDFs) would be applied as Conditions of Approval within priority and general sage-grouse habitat on existing fluid mineral leases.

Similar to Alternative A, new plans of operation for authorized locatable minerals on forest service-administered lands would require the inclusion of measures to avoid or minimize adverse effects to GRSG populations or their habitat. Priority and general habitat would be closed to non-energy leasable mineral leasing and prospecting. No new commercial mineral material sales would be allowed in priority and general habitat, but sales to meet Federal, Tribal, State, County and public needs would be allowed in general habitat; loss of habitat through disturbance in general habitat would be off-set through off-site mitigation. Alternative D would manage priority and general habitat as ROW exclusion areas for new large-scale wind and solar energy facilities (see Land Uses and Realty Management), whereas Alternative B would manage PPH as a new ROW exclusion area and PGH as a new ROW avoidance area.

Although the conservation measures proposed under Alternative D would overall reduce the general impacts on SAS associated with energy and locatable minerals development discussed under Alternative A, Alternative D would be less protective of PPH than Alternative B with respect to new fluid mineral leasing, because Alternative B would close PPH to new fluid mineral leasing. On the other hand, it would be more protective of PGH than Alternative B with respect to new fluid mineral leasing, because Alternative B does not include specific management for new or existing fluid minerals leasing in general habitat. Alternative D would be similar to Alternative B with respect to existing fluid mineral leases by requiring application of design features in priority habitat. Under Alternative D, both priority and general habitat would be closed to non-energy leasable mineral leasing and prospecting as opposed to only PPH under Alternative B.

### ***Cumulative Effects***

Energy development is currently a minor threat present only in Management Zone III but geothermal energy development potential is high throughout Management Zone IV (refer to Chapter 5 of the DEIS). Mining is common across Management Zones III and IV in Nevada and occurs at a variety of scales. Under Alternative D, within Management Zones III IV and V, some of the current management direction associated with energy and locatable minerals development would continue, however, additional emphasis on protecting existing sagebrush would be included. Alternative D is the same as Alternative A with respect to areas closed to entry, but adds NSO restrictions to all PPH and PGH without waiver, exception, or modification. NSO restrictions would apply to PGH with allowance for waivers, exceptions and modifications. Management under Alternatives D would maintain current acreage open to mineral development



but add the application of best management practices and off-site mitigation. Therefore, the direct and indirect effects of energy and locatable minerals development to SAS in Management Zones III, IV and V from the added management actions under Alternative D, which would be largely beneficial for SAS, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to SAS or sagebrush habitat (refer to Chapter 5 of the DEIS).

## **Land Uses and Realty Management**

### ***Direct and Indirect Effects***

Like Alternative B, Alternative D would contain provisions to retain public ownership of priority sage-grouse habitat and to acquire state and private lands with intact subsurface mineral estate where suitable conservation actions for GRSG could not otherwise be achieved, require co-location of new ROWs or SUAs associated with valid existing rights with existing development and, where appropriate, bury new and existing utility lines as mitigation unless not feasible. Unlike Alternative B, Alternative D would manage priority and general habitat as ROW exclusion areas for new large-scale commercial wind and solar energy facilities and ROW avoidance areas for all other ROWs or SUAs. Development within avoidance areas could occur if the development incorporates appropriate RDFs in design and construction (e.g. noise, tall structure, seasonal restrictions, etc.) and development results in no net un-mitigated loss of priority or general habitat. In addition, ROW holders in priority and general habitat would be required to retro-fit existing power lines and other utility structure with perch-detering devices during ROW renewal process. These conservation measures make this alternative more protective of SAS than Alternative A, although the general effects would be the same. It would be less protective than Alternatives B and C with respect to new siting of general ROWs and SUAs because priority habitat would be an avoidance area rather than an exclusion area. But it would be more protective to SAS with respect to large-scale commercial wind and solar energy facilities by excluding them in priority and general habitat altogether.

### ***Cumulative Effects***

Management actions associated with land uses and realty under Alternative D would increase protection of sagebrush habitat, thereby benefitting SAS rather than removing or fragmenting habitat. Under Alternative D, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), some of the current land and realty operations would continue, however, additional emphasis on protecting existing sagebrush habitat and preventing disturbance to GRSG would be included. Land uses and realty management activities would focus ROW exclusion or avoidance areas in Greater Sage-Grouse habitat. Therefore, the direct and indirect effects of lands and realty management to SAS in Zones III, IV and V under Alternative D, which would be largely beneficial for SAS, when combined with the past, present and reasonably foreseeable future actions, would not substantially increase impacts to SAS.

## **Travel, Transportation and Recreation Management**

### ***Direct and Indirect Effects***

Under current management, travel on most Forest Service-administered lands is limited to designated roads, although off road motorized big game retrieval within ½ mile of roads is authorized on the Mountain City, Ruby Mountains, and Jarbidge Ranger Districts of the Humboldt-Toiyabe National Forest, with some restrictions. Like Alternative B, Alternative D would limit motorized travel to designated routes, there would be limited opportunities for road construction with minimum standards applied and no upgrading of current roads, and only recreational SUAs that are neutral or beneficial to sage-grouse would be permitted. Unlike Alternative B, Alternative D would extend these measures beyond PPH to include PGH. In addition, under Alternative D no new recreation facilities (including, but not limited to, campgrounds, day use areas, scenic pullouts, trailheads, etc.) would be constructed in priority and general habitat. Although general impacts would be the same as Alternative A, Alternative D is more restrictive than Alternative A or Alternative B. It would likely reduce habitat loss or fragmentation and disturbance to SAS species by minimizing human use and road construction or upgrades and reduce automotive collisions with individuals of SAS. It could also limit access to caves or rock outcrops, thereby benefitting SAS bat species.

### ***Cumulative Effects***

Recreation is considered a “lesser threat” with respect to “relative cumulative actions” addressed in the DEIS and only for Management Zone V (see Chapter 5 of the DEIS). Management actions associated with travel, transportation and recreation under Alternative D would increase protection of sagebrush habitat within PPH and PGH, thereby benefitting SAS rather than removing or fragmenting habitat. Under Alternative D, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), some of the current travel, transportation and recreation management direction would continue, however, additional emphasis on protecting existing sagebrush habitat would be included. Therefore, the direct and indirect effects of travel, transportation and recreation management to SAS in Management Zones III, IV and V under Alternative D, which would be largely beneficial for SAS, when combined with the past, present and reasonably foreseeable future actions, would not substantially increase impacts to SAS.

### **Alternative E**

All management actions under Alternative E would correspond to areas identified on the Sage-Grouse Management Areas (SGMAs) Map contained in the “2012 Strategic Plan for the Conservation of Greater Sage-Grouse in Nevada” (2012 Plan) produced by Nevada stakeholders at the request of the governor. The SGMAs include four categories - Occupied Habitat, Suitable Habitat, Potential Habitat, and Non Habitat areas - as defined in the 2012 Plan. The Nevada Sagebrush Ecosystem Council would further refine the habitat categories within the SGMAs and determine where the best possible habitat exists based on recommendations from the Nevada Sagebrush Ecosystem Technical Team. All management Actions would be implemented through a coordinated effort among local, state and federal agencies, unless an agency is specifically

noted. Alternative E would not provide fixed exclusion or avoidance areas, but would seek to achieve conservation through a goal of “no net loss” in the Occupied, Suitable and Potential Habitat categories for activities that could be controlled, such as a planned disturbance or development. Management under Alternative E would be subject to an avoid, minimize, and mitigate approach, which would provide a lower level of certainty than alternatives that have fixed exclusion and avoidance land allocations based on PPH and PGH designations.

## **Vegetation and Soils**

### ***Direct and Indirect Effects***

Under Alternative E, landscape-level treatments in Sage-Grouse Management Areas (SGMAs) would be initiated to reverse the effects of pinyon-juniper encroachment and restore healthy, resilient sagebrush ecosystems. Plans to remove Phase I and Phase II encroachment and treat Phase III encroachment would be aggressively implemented to reduce the threat of severe conflagration and restore SGMAs where possible, especially in areas in close proximity to Occupied and Suitable Habitat. Temporary roads to access treatment areas would be allowed and constructed with minimum design standards to avoid and minimize impacts and removed and restored upon completion of treatment. Under Alternative E, the State of Nevada would continue to incentivize and assist in the development of bio-fuels and other commercial uses of pinyon-juniper resources and increase the incentives for private industry investment in biomass removal, land restoration, and renewable energy development by authorizing stewardship contracts for up to 20 years. Alternative E would provide for an increase in conifer encroachment management for sagebrush habitat compared to Alternative A, B or C.

Under Alternative E, invasive plants would be managed through a combination of surveys, biological control, educational activities, native planting and reseedling of previously treated sites in areas susceptible to invasion, and weed-free gravel and forage certifications and inspections. SGMAs would be managed to prevent invasive species and to suppress and restore areas with existing infestations. Existing areas of invasive vegetative that pose a threat to SGMAs would be treated through the use of herbicides, fungicides or bacteria to control cheatgrass and medusahead infestations. All burned areas within SGMAs would be reviewed and evaluated in a timely manner to ascertain the reclamation potential for reestablishing Sage-Grouse habitat, enhancing ecosystem resiliency, and controlling invasive weed species. The effects under Alternative E would be similar to those under Alternative D.

### ***Cumulative Effects***

Under Alternative E, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), current vegetation and soils management treatments, including mechanical, manual, chemical, and biological control of invasive plants and pinyon and juniper, would continue and the short-term negative impacts of these activities on SAS and SAS habitats would continue to be outweighed by the long-term beneficial impacts including increased forage, cover quality and composition, reduced predator perches, decreased fire spread and intensity and potentially

increased water availability. However, additional emphasis on protecting existing sagebrush habitat under Alternative E would provide an added benefit to sagebrush habitat. Therefore, the direct and indirect effects of vegetation and soils management to SAS in Management Zones III, IV and V from the management actions under Alternative E, which would be largely beneficial for SAS, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to SAS or sagebrush habitat.

## **Livestock Grazing**

### ***Direct and Indirect Effects***

Alternative E would manage grazing permits to maintain or enhance SGMAs. It would utilize livestock grazing, when appropriate, as a management tool, to improve Sage-Grouse habitat quantity, quality or to reduce wildfire threats which could benefit SAS as well. Alternative E would expand the promotion of proper livestock grazing practices that promote the health of perennial grass communities in order to suppress the establishment of cheatgrass. Riparian areas would be managed to current agency standards. Within riparian areas, Alternative E would promote grazing within acceptable limits and development of additional infrastructure (e.g., fences and troughs) in order to facilitate this action. In comparison with Alternative A, management under Alternative E would provide less protection to SAS and their habitats. In general, there are fewer conservation measures associated with this alternative. Impacts to riparian structure that could negatively impact sagebrush-associated bat species would be expected to be greater due to more areas being available for livestock use. Bighorn sheep could be subject to increased competition at spring sources and, depending upon the type of livestock authorized, disease transmission. Fewer overall sagebrush-specific habitat enhancement or maintenance actions would occur under this alternative.

### ***Cumulative Effects***

Although livestock grazing occurs throughout all management zones, in the DEIS it is only considered a “lesser threat” with respect to “relative cumulative actions” and only for Management Zone V (see Chapter 5 of the DEIS). In addition, portions of Management Zone III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories which have the potential to compound the effects of livestock grazing on these lands; Forest Service-administered lands within Management zones IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); see Chapter 5 of the DEIS].

Under Alternative E, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), there would be fewer restrictions on livestock grazing than under Alternative A. In addition, riparian impacts would be expected to be greater due to more areas being available for livestock use and fewer overall GRSG specific habitat enhancement/maintenance actions would occur. Wild horse and burro Territories would be managed for Appropriate Management Level as under current management. Under Alternative E, the direct and indirect effects of livestock grazing, in

conjunction with the past, present and reasonably foreseeable future actions, could result in the increased loss and fragmentation of the existing sagebrush habitat in Management Zones III, IV and V (refer to Chapter 5 of the DEIS).

## **Fire and Fuels**

### ***Direct and Indirect Effects***

Alternative E would utilize a unique approach to fire and fuels management. Under Alternative E, emphasis would be on sagebrush habitat protection and restoration within the SGMAs. With respect to hazardous fuels treatments, this alternative sets a goal of supporting incentives for developing a beneficial use for biomass. Wildland fires in SGMAs would be managed to reduce the number of wildfires that escape initial attack and become greater than 300 acres down to two to three percent of all wildfire ignitions over a ten year period. Additional emphasis under Alternative E integrates the prepositioning of suppression resources and preventative actions similar to Alternative D. Prepositioning and preventative actions would increase the likelihood of successful fire management actions with response to wildfire. Fuels reduction treatments would be similar to Alternative B, with added emphasis on coordination of state and local agencies and individual landowners. While the general short-term impacts fire and fuels conservation measures on SAS would be the same as those described under Alternative A, the long-term beneficial effects of the measures on SAS would be similar to those of Alternative B.

### ***Cumulative Effects***

The cumulative effect of management actions under Alternative E, when combined with the past, present and reasonably foreseeable future actions are similar to the cumulative effects described in Alternative B, and are not expected to be substantial or remove or fragment sagebrush habitat past a critical threshold within Management Zones III, IV and V (refer to Chapter 5 of the DEIS).

## **Wild Horse and Burro Management**

### ***Direct and Indirect Effects***

Management under Alternative E would maintain wild horses at AML in WHTs to avoid and minimize impacts on Sage-Grouse Management Areas, evaluate conflicts with WHT designations in Sage-Grouse Management Areas, modify Land Use Plans and Resource Management Plans to avoid negative impacts on GRSG and, if necessary, resolve conflicts between the Wild and Free Roaming Horse and Burro Act and the Endangered Species Act. Wild horse and burro management under Alternative E would be similar to Alternative A. Therefore, impacts to SAS are expected to be similar to that of Alternative A.

### ***Cumulative Effects***

Portions of Management Zone III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories. Forest Service-administered lands within Management zones IV and V do not contain wild horse and burro Territories [IV (95 percent of

BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); see Chapter 5 of the DEIS]. Under Alternative E, wild horse and burro Territories would be managed for Appropriate Management Level as under current management. Therefore, the direct and indirect effects of wild horse and burro management to SAS in Management Zones III, IV and V from the management actions under Alternative E, which would be largely neutral for SAS, when combined with the past, present and reasonably foreseeable future actions, would not substantially increase impacts to SAS or sagebrush habitat.

## **Energy and Locatable Minerals Development**

### ***Direct and Indirect Effects***

The Alternative E management strategy would be to avoid conflicts with GRSG habitat by siting new minerals and energy facilities and activities outside of habitat wherever possible. Projects that have an approved BLM notice, plan of operation, right-of-way, or drilling plan would be exempt from any new mitigation requirements above and beyond what has already been stipulated in the projects' approvals. Exploration projects would be designed for mineral access and the betterment of GRSG habitat. Roads and other ancillary features that impact GRSG habitat would be designed to avoid where feasible and otherwise minimize and mitigate impacts in the short and long term. New linear features would be sited in existing corridors or, at a minimum, co-located with existing linear features in SGMAs. Measures to deter raptor perching and raven nesting on elevated structures would be applied to energy development projects. Energy developers would be required to work closely with state and federal agency experts to determine important GRSG nesting, brood rearing and winter habitats and avoid those areas, and energy development or infrastructure features would be restricted within a 0.6 mile (1 km) radius around seeps, springs and wet meadows within identified brood rearing habitats wherever possible. In addition, Alternative E would aggressively engage in reclamation efforts as projects are completed. Renewed mining could disturb or destroy existing Townsend's big-eared bat roosts while prioritization of reclamation of previously defunct mines could negatively impact Townsend's big eared bats by trapping individuals or eliminating roost habitat if reclamation is improperly implemented. As previously stated, Alternative E does not provide fixed exclusion or avoidance areas, leaving all management subject to an avoid, minimize, and mitigate approach, which provides a lower level of certainty than alternatives that have fixed exclusion and avoidance land allocations based on PPH and PGH designations. Under Alternative E, there would be the possibility for more land use for both energy and minerals development than under Alternative A, because construction of projects within or adjacent to sagebrush habitat would not be ruled out. Therefore, the general impacts of energy and locatable minerals development on SAS discussed under Alternative A would have the potential to increase under Alternative E.

### ***Cumulative Effects***

Energy development is currently a minor threat present only in Management Zone III but geothermal energy development potential is high throughout Management Zone IV (refer to Chapter 5 of the DEIS). Mining is common across Management Zones III and IV in Nevada and



occurs at a variety of scales. Under Alternative E, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), there would be no fixed exclusion or avoidance areas, as under Alternatives B, C, D or F, leaving all management subject to an avoid, minimize, and mitigate approach, which provides a lower level of certainty than alternatives that have fixed exclusion and avoidance land allocations based on habitat designations. In addition, there would be the possibility for more land use for both energy and minerals development than under Alternative A, because construction of projects within or adjacent to GRS habitat would not be ruled out. Therefore, under Alternative E, the direct and indirect effects of energy and locatable minerals development, in conjunction with the past, present and reasonably foreseeable future actions, may result in the increased loss and fragmentation of the existing sagebrush habitat in Management Zones III, IV or V (refer to Chapter 5 of the DEIS).

## **Land Uses and Realty Management**

### ***Direct and Indirect Effects***

Under Alternative E, no areas would be subject to exclusion or avoidance, but habitat disturbance, including habitat improvement projects, in Occupied and Suitable Habitat would be limited to not more than five percent per year, and in Potential Habitat to not more than twenty percent per year, per SGMA, unless habitat treatments show credible positive results. On federal lands in Nevada with pre-approved activities, no new mitigation would take place beyond previously approved in Plans of Development, right of ways, or drilling plans. General guidance would be to avoid when possible, minimize adverse effects as practicable, and mitigate adverse effects in Occupied or Suitable Habitat. Whenever possible, this alternative would locate facilities in non-habitat areas, site new linear features in existing corridors or co-locate them with other existing features and engage in reclamation and weed control efforts. This alternative provides fewer measures when compared to Alternatives A, B, C, D or F to reduce the general impacts of land uses and realty management described under Alternative A to SAS and sagebrush habitats. Therefore, Alternative E would not be as protective of SAS habitat as any of the other alternatives.

### ***Cumulative Effects***

Management actions associated with land uses and realty under Alternative E would not include specific exclusion or avoidance areas but would limit total disturbance within Occupied and Suitable Habitats and implement an avoid, minimize, mitigate approach, as discussed above. This would provide a lower level of certainty for sagebrush habitat protection under Alternative E than under alternatives that have fixed exclusion and avoidance areas based on habitat designations and could lead to greater habitat fragmentation under Alternative E. Therefore, the direct and indirect effects land uses and realty management under Alternative E, in conjunction with the past, present and reasonably foreseeable future actions, may result in the increased loss and fragmentation of the existing sagebrush habitat in Management Zones III, IV or V (refer to Chapter 5 of the DEIS).

## **Travel, Transportation and Recreation Management**

### ***Direct and Indirect Effects***

Under Alternative E, travel, transportation and recreation management would essentially remain the same as it currently is under Alternative A. Therefore, impacts to SAS under Alternative E are expected to be similar to those of Alternative A.

### ***Cumulative Effects***

Recreation is considered a “lesser threat” with respect to “relative cumulative actions” addressed in the DEIS and only for Management Zone V (see Chapter 5 of the DEIS). Current travel, transportation and recreation management as it exists under Alternative A would continue under Alternative E. The limitation of motorized travel to existing routes and permitting of recreational SUAs that are neutral or beneficial to sage-grouse, as well as limited opportunities for road construction and upgrading of current roads, would not be instituted as they would be in Alternatives B, C, D and F. Under Alternative E, the direct and indirect effects from travel, transportation and recreation management, in conjunction with the past, present and reasonably foreseeable future actions, may result in the increased loss and fragmentation of the existing sagebrush habitat in Management Zones III, IV and V (refer to Chapter 5 of the DEIS).

## **Alternative F**

### **Vegetation and Soils**

#### ***Direct and Indirect Effects***

Unlike Alternative B, Alternative F includes a conservation measure specifically directed at invasive plants that would develop and implement methods for prioritizing and restoring sagebrush steppe invaded by nonnative plants. Like Alternative B, Alternative F would manage pinyon-juniper encroachment under current direction (see Alternative A). In addition, GRSG vegetation management conservation measures would benefit weed and conifer control efforts by prioritizing restoration efforts, including reducing invasive plants, and monitoring and controlling invasive species after fuels treatments and at existing new range improvements in all occupied GRSG habitat (PPH and PGH as opposed to only PPH under Alternative B). Together, these measures would result in a net benefit to sagebrush habitat by reducing impacts from invasive plants and pinyon-juniper encroachment on sagebrush habitat, as described under Alternative A, more so than Alternative B although the effects of the treatments would be the same.

#### ***Cumulative Effects***

Under Alternative F, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), current vegetation and soils management treatments, including mechanical, manual, chemical, and biological control of invasive plants and pinyon and juniper, would continue and the short-term negative impacts of these activities on SAS and sagebrush habitats would continue to be outweighed by the long-term beneficial impacts including increased forage, cover quality and



composition, reduced predator perches, decreased fire spread and intensity and potentially increased water availability. However, additional emphasis on protecting existing sagebrush habitat under Alternative F would provide an added benefit to SAS. Therefore, the direct and indirect effects of vegetation and soils management to SAS in Management Zones III, IV and V from the management actions under Alternative F, which would be largely beneficial for SAS, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to SAS or sagebrush habitat.

## **Livestock Grazing**

### ***Direct and Indirect Effects***

Alternative F would include beneficial management actions similar to those of Alternative B except they would apply in all GRSG habitats. These include completion of Land Health Assessments, consideration of grazing methods and systems to reduce impacts on sage-grouse habitat, consideration of retiring vacant allotments, improved management of riparian areas and wet meadows, evaluation of existing introduced perennial grass seedings, authorization of new water developments and structural range improvements only when beneficial to GRSG, BMPs for West Nile Virus, and fence removal, modification or marking. Together these efforts would reduce the impacts from grazing on SAS described under Alternative A to a larger degree than Alternative B and expand the beneficial impacts discussed under Alternative B over a larger area.

### ***Cumulative Effects***

Although livestock grazing occurs throughout all management zones, in the DEIS it is only considered a “lesser threat” with respect to “relative cumulative actions” and only for Management Zone V (see Chapter 5 of the DEIS). In addition, portions of Management Zone III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories which have the potential to compound the effects of livestock grazing on these lands; Forest Service-administered lands within Management zones IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); see Chapter 5 of the DEIS].

Under Alternative F, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), livestock grazing would continue to be managed through existing grazing plans. Wild horse and burro Territories would be managed for Appropriate Management Level. However, additional emphasis on protecting existing sagebrush habitat under Alternative F would provide an added benefit to SAS. Therefore, the direct and indirect effects of livestock grazing and wild horse and burro management to SAS in Management Zones III, IV and V from the management actions under Alternative F, which would be largely beneficial for SAS, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to SAS or sagebrush habitat.

## **Fire and Fuels**

### ***Direct and Indirect Effects***

Fire and fuels management under Alternative F would essentially be the same as that under Alternative B. Please refer to Alternative B. The impacts on SAS would be the same.

### ***Cumulative Effects***

The cumulative of management actions under Alternative F, when combined with the past, present and reasonably foreseeable future actions are similar to the cumulative effects described in Alternative B, and are not expected to be substantial or remove or fragment sagebrush habitat past a critical threshold within Management Zones III, IV and V (refer to Chapter 5 of the DEIS).

## **Wild Horse and Burro Management**

### ***Direct and Indirect Effects***

Wild horse and burro management under Alternative F would be similar to that proposed under Alternative B except all conservation measures, but the measure prioritizing gathers in PPH, would extend to all occupied GRSG habitat. Therefore, the beneficial impacts on SAS under Alternative F would be the same as those under Alternative B except they would apply to all occupied GRSG habitat making Alternative F more protective of SAS and SAS habitat than Alternative B.

### ***Cumulative Effects***

Refer to Alternative B. Cumulative effects would be the same.

## **Energy and Locatable Minerals Development**

### ***Direct and Indirect Effects***

Energy and locatable minerals development is similar to proposed management under Alternative B. Under Alternative F siting of wind energy development would be prevented in PPH; PPH would be closed to new fluid mineral leasing, nonenergy leasable mineral leasing, and mineral material sales; it would be proposed for withdrawal from mineral entry; no new surface occupancy (NSO) would be stipulated for leased fluid minerals and a 3% disturbance cap would be applied. Numerous conservation measures would be implemented to reduce impacts from mineral exploration and development activities in PPH. Like Alternative B, Alternative F does not include specific management for locatable, or saleable or nonenergy minerals in PGH. Unlike Alternative B, Alternative F directly addresses wind energy and fluid minerals development outside of PPH: wind energy would be sited at least five miles from active sage-grouse leks and at least four miles from the perimeter of sage-grouse winter habitat and areas within 4 miles of active sage-grouse leks would be closed to new fluid minerals leasing. Alternative F, although similar to Alternative B, would reduce the impacts of energy development on SAS and SAS habitat, as described under Alternative A, more so than

Alternative B because it addresses siting of wind energy and fluid minerals leasing outside of PPH more thoroughly than Alternative B.

### ***Cumulative Effects***

Energy development is currently a minor threat present only in Management Zone III but geothermal energy development potential is high throughout Management Zone IV (refer to Chapter 5 of the DEIS). Mining is common across Management Zones III and IV in Nevada and occurs at a variety of scales. Management actions associated with energy and locatable minerals development under Alternative B would increase protection of sagebrush habitat, primarily within PPH, thereby benefitting SAS rather than removing or fragmenting habitat. Under Alternatives B, within Management Zones III and IV, some of the current energy and locatable minerals management direction would continue, however, additional emphasis on protecting existing sagebrush habitat by adding all PPH to existing closures and proposing it for withdrawal would be included. Therefore, the direct and indirect effects of energy and locatable minerals development to SAS in Management Zones III, IV and V from the management actions under Alternative B, which would be largely beneficial for SAS, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to SAS or sagebrush habitat.

## **Land Uses and Realty Management**

### ***Direct and Indirect Effects***

Land uses and realty management under Alternative F would essentially be the same as that under Alternative B. Please refer to Alternative B. The effects on SAS and their habitat would be the same.

### ***Cumulative Effects***

Management actions associated with land uses and realty under Alternative F would increase protection of sagebrush habitat, thereby benefitting SAS rather than removing or fragmenting habitat. Under Alternative F, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), some of the current land and realty operations would continue, however, additional emphasis on protecting existing sagebrush habitat and preventing disturbance to GRSG would be included. Lands and realty management activities would focus ROW exclusion or avoidance areas in Greater Sage-Grouse habitat. Therefore, the direct and indirect effects of lands and realty management to SAS in Management Zones III, IV and V under Alternative F, which would be largely beneficial for SAS, when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts to SAS or their habitat.

## **Travel, Transportation and Recreation Management**

### ***Direct and Indirect Effects***

With respect to travel, transportation and recreation, Alternative F is similar to Alternative B: within PPH, only recreational SUAs that are neutral or beneficial to GRSG would be permitted,

there would be limited opportunities for new route construction and upgrading of existing routes could only occur if they would not result in a new route category (road, primitive road, or trail) or capacity, unless it is necessary for motorist safety, or eliminates the need to construct a new road. In addition, Alternative F would expand the Alternative B measure restricting motorized travel to designated routes in PPH to include PGH, designated routes in sage-grouse priority habitat would be considered for closure, camping areas within 4 miles of active leks would seasonally be closed, permanent seasonal road or area closures to protect breeding, nesting and brood rearing sage-grouse would be implemented and new road construction would be prohibited within 4 miles of active sage-grouse leks. Therefore, the general travel, transportation and recreation effects of Alternative F on SAS would be the same as those for Alternatives A and B, although Alternative F would be more protective, particularly with respect to reducing disturbance to SAS and protecting sagebrush habitat from degradation and introduction of invasive weeds, than Alternative B due to the additional measures.

### ***Cumulative Effects***

Recreation is considered a “lesser threat” with respect to “relative cumulative actions” addressed in the DEIS and only for Management Zone V (see Chapter 5 of the DEIS). Management actions associated with travel, transportation and recreation under Alternative F would increase protection of sagebrush habitat within PPH and, in some instances, PGH and PPH, thereby benefitting SAS rather than removing or fragmenting habitat. Under Alternative F, within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), some of the current travel, transportation and recreation management direction would continue, however, additional emphasis on protecting existing sagebrush habitat would be included. Therefore, the direct and indirect effects of travel, transportation and recreation management to SAS in Management Zones III, IV and V under Alternative D, which would be largely beneficial for SAS, when combined with the past, present and reasonably foreseeable future actions, would not substantially increase impacts to SAS or sagebrush habitat.

## **C. SENSITIVE PLANTS**

Forest sensitive plants have been grouped for this analysis due to the similar types of impacts they could experience and the programmatic nature and landscape scale of this analysis. The landscape scale effects of the proposed conservation measures for each program area within each alternative will be analyzed generally and collectively for this group of species. For each species, the NatureServe Ranking is provided in the Status section to provide additional context for the global and state rarity of the species. For a thorough discussion of NatureServe rankings, please refer to the NatureServe web site (NatureServe 2013).

### ***Antennaria arcuata (Meadow pussytoes)***

#### ***Status***

Meadow pussytoes is considered globally imperiled (G2) and critically imperiled (S1) in Nevada. Meadow pussytoes was considered for federal listing under the Endangered Species

Act from 1975 to 1996, but based on the absence of significant downward trends and survey work completed in Wyoming, where most populations are known, Meadow pussytoes was not recommended for listing.

### ***Distribution***

Meadow pussytoes occurs primarily in Wyoming, with small numbers of disjunct occurrences in Nevada and Idaho. In Nevada, documented occurrences are restricted to Elko County.

### ***Habitat Associations/Natural History and Threats***

Meadow pussytoes is a stoloniferous, short-lived perennial forb in the sunflower family. The species typically flowers in July and August. Meadow pussytoes occurs in sagebrush and grassland associations within seasonally dry portions of moist alkaline meadows, seeps, and springs at elevations of 6,200-6,500 ft. (Morefield 2001). Data from Wyoming occurrences indicate that meadow pussytoes occurs on soils that are neutral to basic with high concentrations of calcium, magnesium, sodium, and organic content and low concentrations of selenium (Heidel 2013). Threats to meadow pussytoes include overgrazing by livestock in late summer, alteration of hydrology, road construction and maintenance, competition with invasive non-native plants, and mineral exploration and development.

## ***Asclepias eastwoodiana (Eastwood milkweed)***

### ***Status***

Eastwood milkweed is considered imperiled globally and in Nevada.

### ***Distribution***

Eastwood milkweed is endemic to Nevada, where it occurs in Esmeralda, Lander, Lincoln, and Nye Counties.

### ***Habitat Associations/Natural History and Threats***

Eastwood milkweed is a low-growing perennial forb that typically flowers in May and June. The species occurs within mixed desert shrub, sagebrush, and pinyon-juniper woodlands in open areas, frequently in small washes or other moisture-accumulating microsites (Morefield 2001). The approximate elevation range of Eastwood milkweed is 3,000-7,080 ft. Threats to Eastwood milkweed include trampling by livestock and habitat loss due to mining and road construction (Morefield 2001).

## ***Astragalus lentiginosus var. latus (Broad-pod freckled milkvetch)***

### ***Status***

Broad-pod freckled milkvetch is considered imperiled globally (T2) and in Nevada (S2).

### ***Distribution***

Broad-pod freckled milkvetch is a Nevada endemic found in Elko and White Pine Counties, Nevada.

### ***Habitat Associations/Natural History and Threats***

Broad-pod freckled milkvetch is a perennial forb in the pea family. The subspecies occurs within pinyon-juniper woodlands on gravelly or sandy calcareous soils, generally on moderate to steep slopes, at elevations of 5,700-9,900 ft. (Morefield 2001). Threats to Broad-pod freckled milkvetch include livestock grazing, recreation, road development and maintenance, mining, and invasive species.

### ***Astragalus robbinsii* var. *occidentalis* (Lamoille Canyon milkvetch)**

#### ***Status***

Lamoille Canyon milkvetch is considered imperiled to vulnerable globally (T2T3) and in Nevada (S2S3).

#### ***Distribution***

Lamoille Canyon milkvetch is a Nevada endemic that occurs in Elko County in the Ruby and east Humboldt Mountains.

### ***Habitat Associations/Natural History and Threats***

Lamoille Canyon milkvetch is a perennial forb in the pea family that typically flowers from late June to August. The subspecies occurs in willow, aspen or shrubby cinquefoil communities in seeps, riparian strips, and high-elevation meadow margins on moist to seasonally dry sandy loam soils (Morefield 2001). The approximate elevation range of Lamoille Canyon milkvetch is 6,050-10,000 ft. Threats to Lamoille Canyon milkvetch include recreation use and development, livestock grazing, road construction and maintenance, and mineral exploration and development (Morefield 2001).

### ***Astragalus toquimanus* (Toquima milkvetch)**

#### ***Status***

Toquima milkvetch is considered imperiled globally (G2) and in Nevada (S2).

#### ***Distribution***

Toquima milkvetch is a Nevada endemic documented from the Monitor and Toquima Ranges in Nye County.

### ***Habitat Associations/Natural History and Threats***

A member of the pea family, Toquima milkvetch is a perennial forb that typically flowers in May and June. The species occurs within pinyon-juniper and sagebrush vegetation, typically on gravelly hillsides with gentle slopes in areas of basic or calcareous soils, and is often found growing underneath sagebrush plants. The documented elevation range of Toquima milkvetch is 6,480-7,520 ft. (Morefield 2001). Threats to the species include livestock grazing, mining activity, and road construction and maintenance.

## **Astragalus uncialis (Currant milkvetch)**

### ***Status***

Currant milkvetch is considered globally imperiled (G2) and critically imperiled in Nevada (S1).

### ***Distribution***

Currant milkvetch is documented from Millard County, Utah, and Nye County, Nevada.

### ***Habitat Associations/Natural History and Threats***

A member of the pea family, Currant milkvetch is a long-lived low perennial forb that grows in dense tufts and flowers from early May to mid-June. The species occurs in desert shrub and sagebrush vegetation on knolls, gullied foothills, stony washes, saline flats, gently sloping hillsides, and alluvial fans in calcareous sandy-clay or gravelly alkaline soils. Currant milkvetch is documented from an elevation range of approximately 4,800-6,050 ft. in Nevada (Morefield 2001). Threats to Currant milkvetch include livestock grazing, mining activity, and off road vehicle use.

## **Boechera falcatoria (Grouse Creek rockcress)**

### ***Status***

Grouse Creek rockcress is considered critically imperiled to imperiled globally (G1G2) and critically imperiled in Nevada (S1).

### ***Distribution***

Grouse Creek rockcress occurs in Utah and Nevada. In Nevada, the species is apparently restricted to the southern Ruby Mountains.

### ***Habitat Associations/Natural History and Threats***

Grouse Creek rockcress is a perennial forb in the mustard family. The species occurs on exposed gravelly wind-swept passes with low sagebrush in mountain mahogany, sagebrush, and pinyon-juniper associations at elevations of 6,600-9,000 ft. Livestock grazing has been identified as a potential threat to this species.

## **Botrychium ascendens (Upswept moonwort)**

### ***Status***

Upswept moonwort is considered globally vulnerable (G3) and critically imperiled in Nevada (S1).

### ***Distribution***

Upswept moonwort is widely distributed throughout the western United States and Canada but is locally rare across its range. The species is documented from Alaska, California, Minnesota, Montana, Nevada, Oregon, Wyoming, Alberta, British Columbia, Newfoundland, Ontario,



Quebec, and Yukon Territory. On the Humboldt-Toiyabe NF, the species is documented from the Spring Mountains National Recreation Area in Nevada and Cooney Lake on the Bridgeport RD in California.

#### ***Habitat Associations/Natural History and Threats***

Upswept moonwort is a diminutive (6-10 cm.) perennial fern. Across its range, the species occurs in diverse habitats, including riparian areas, seeps, springs, alpine meadows, avalanche meadows, grassy roadsides, and shrublands. As with other moonworts, upswept moonwort exists underground in the gametophyte stage for much of its life cycle and may not emerge every year, making surveys unreliable. In Nevada, upswept moonwort is documented at elevations of approximately 8,136-11,646. Although specific threats have not been identified for upswept moonwort in Nevada, populations are small and isolated, making them particularly vulnerable to stochastic natural phenomena.

#### **Botrychium crenulatum (Dainty moonwort)**

##### ***Status***

Dainty moonwort is considered globally vulnerable (G3) and critically imperiled in Nevada (S1).

##### ***Distribution***

Dainty moonwort is widely distributed throughout the western United States and Canada but is locally rare across its range. Dainty moonwort is documented from Arizona, California, Idaho, Montana, Nevada, Oregon, Utah, Washington, Wyoming, British Columbia, and Alberta. On the Humboldt-Toiyabe NF, dainty moonwort is documented from the Spring Mountains National Recreation Area, and the Jarbidge and Ruby Mountains RDs in Nevada and the Bridgeport RD in California.

#### ***Habitat Associations/Natural History and Threats***

Dainty moonwort is a small (6-16 cm) perennial fern that occurs in diverse habitats, including stream bottoms, seeps, marsh edges, wet swales, alpine meadows, and grassy roadsides, often on soils of reprecipitated calcium. Dainty moonwort is the most hydrophyllic of the moonworts and typically grows in saturated soils. In Nevada, fronds of dainty moonwort emerge in the spring, typically become fertile in late spring, and die in the fall. As with other moonworts, dainty moonwort exists underground in the gametophyte stage for much of its life cycle and may not emerge every year, making surveys unreliable. In Nevada, dainty moonwort is documented at elevations of approximately 8,136-11,154 ft. Because populations of dainty moonwort are small and highly disjunct, they are particularly vulnerable to stochastic natural phenomena.

#### **Botrychium lineare (Slender moonwort)**

##### ***Status***

Slender moonwort is considered globally imperiled (G2) and its status has not been assessed in Nevada (SNR).



### ***Distribution***

Slender moonwort is widely distributed throughout the western United States and Canada but is locally rare across its range. In the United States, the species is documented from Alaska, California, Colorado, South Dakota, Montana, Utah, Washington, and Wyoming, and in Canada it is documented from Yukon Territory and historically from New Brunswick and Quebec. In Nevada, slender moonwort is documented from the Spring Mountains National Recreation Area.

### ***Habitat Associations/Natural History and Threats***

Slender moonwort is a small (6-18cm) perennial fern that occupies highly varied habitats across its range, including moist to dry meadows, bogs, swamps, roadside ditches, dry fields, and forests in a variety of areas ranging from limestone cliffs and gravelly beaches to forest understory. Slender moonwort is among the least frequently encountered moonworts. As with other *Botrychium* species, slender moonwort exists underground in the gametophyte stage for much of its life cycle and may not emerge every year, making surveys unreliable. Most occurrences are montane at 4,900-9,800 ft., but the species occupies elevation from sea level to 10,000 ft. In Nevada, slender moonwort is documented from 8,497-9,776 ft. Threats to slender moonwort include road maintenance, non-native invasive species, and overgrazing by livestock. Because populations of slender moonwort are small and highly disjunct, they also are vulnerable to stochastic natural phenomena.

### ***Botrychium tunux (Moosewort)***

#### ***Status***

Moosewort is considered vulnerable globally (G3) and critically imperiled in Nevada (S1).

#### ***Distribution***

Moosewort is broadly distributed across the western United States and Canada but is locally rare in some states in which it occurs. Moosewort is documented from Alaska, California, Colorado, Idaho, Montana, New Mexico, Nevada, and Yukon Territory. On the Humboldt-Toiyabe NF, moosewort is documented from the Spring Mountains National Recreation Area in Nevada and the Bridgeport RD in California.

#### ***Habitat Associations/Natural History and Threats***

Moosewort is a small (6-12 cm.) perennial fern. Across its range, the species occurs in diverse habitats, including low elevation coastal beaches and dunes in Alaska, well-drained rocky meadows in California, and sparsely vegetated alpine scree slopes in Montana, Wyoming and Colorado. In Nevada, the species is associated with seeps, and springs at 9,186-9,842 ft. On the Humboldt-Toiyabe NF, moosewort is documented from Spring Mountains in Nevada and the Bridgeport Ranger District in California. As with other moonworts, peculiar moonwort exists underground in the gametophyte stage for much of its life cycle and may not emerge every year, making surveys unreliable. Threats to moosewort include all-terrain vehicle use, grazing by wild horses, and debris avalanches. Small and highly disjunct populations of moosewort (such as

those that occur on the Humboldt-Toiyabe NF) also are vulnerable to stochastic natural phenomena.

### **Epilobium nevadense (Nevada willowherb)**

#### ***Status***

Nevada willowherb is imperiled globally (G2) and in Nevada (S2).

#### ***Distribution***

Nevada willowherb occurs in Nevada and Utah. In Nevada, the species is documented from Clark, Eureka, and Lincoln Counties.

#### ***Habitat Associations/Natural History and Threats***

A member of the evening primrose family, Nevada willowherb is a perennial subshrub that typically flowers from July through August. The species occurs within pinyon pine and ponderosa pine communities on limestone talus slopes and rock outcrops at an elevation range of 6,000-8,930 ft. in NV (Morefield 2001). Threats to Nevada willowherb include road construction, mineral exploration and extraction, and recreation.

### **Eriogonum douglasii var. elkoense (Sunflower Flat buckwheat)**

#### ***Status***

Sunflower Flat buckwheat is considered critically imperiled globally (T1) and in Nevada (S1).

#### ***Distribution***

Sunflower Flat buckwheat is known only from the Sunflower Flats area northeast of Wild Horse State Park in Elko County, Nevada

#### ***Habitat Associations/Natural History and Threats***

Sunflower Flat buckwheat is a perennial forb that typically flowers between May and July. Sunflower Flat buckwheat occurs within mixed grassland and sagebrush communities on sandy to gravelly flats and slopes at elevations of 6,200-6900 ft. Identified threats to Sunflower Flat buckwheat include grazing and trampling by livestock and wildlife, competition from invasive weeds, road maintenance, fuel treatments, recreation, and mining activities.

### **Eriogonum esmeraldense var. toiyabense (Toiyabe buckwheat)**

#### ***Status***

Toiyabe buckwheat is considered imperiled globally (T2) and in Nevada (S2).

#### ***Distribution***

Toiyabe buckwheat is endemic to Nevada. The variety is documented from the Toiyabe, Toquima, and Monitor ranges in Nye County, where it can be locally common, and from the Shoshone and Independent mountains in Lander and Elko Counties, respectively, where it is locally infrequent.

### ***Habitat Associations/Natural History and Threats***

Toiyabe buckwheat is an annual forb that typically flowers between June and September. Toiyabe buckwheat occurs in saltbush, sagebrush, and mountain mahogany communities, and in pinyon-juniper and montane conifer woodlands on sandy to gravelly flats and slopes at elevations of 6,900-10,500 ft. Primary threats have not been assessed for this species.

### ***Eriogonum lewisii (Lewis's buckwheat)***

#### ***Status***

Lewis's buckwheat is considered imperiled to vulnerable globally (G2G3) and in Nevada (S2S3).

#### ***Distribution***

Lewis's buckwheat is a Nevada endemic documented from north-central Elko County and northern Eureka County in the Bull Run, Independence, Tuscarora and Jarbidge Mountains.

### ***Habitat Associations/Natural History and Threats***

Lewis's buckwheat is a small, long-lived perennial that flowers from June to July and sets seed between early June and the end of August. The species occurs within low sagebrush (*Artemisia arbuscula*) and squirreltail (*Elymus elymoides*) vegetation on dry, exposed, shallow, soils on convex ridge-line knolls and crests on flat to moderately steep slopes of all aspects (Morefield 2001). The approximate elevation range of Lewis's buckwheat is 6,470-9,720 ft. Threats to Lewis's buckwheat include mineral exploration and development, development and maintenance of roads and electronic sites, off-road vehicle travel, trampling by livestock, fire, and fire suppression activities (Morefield 2001).

### ***Jamesia tetrapetala (Basin jamesia)***

#### ***Status***

Basin jamesia is considered imperiled globally (G2) and in Nevada (S2).

#### ***Distribution***

Within Nevada, Basin jamesia is documented from Lincoln, Nye, and White Pine Counties, in the Highland, Snake, and Grant Ranges. The species also is documented from the House Range in Millard County, Utah.

### ***Habitat Associations/Natural History and Threats***

Basin jamesia is a perennial shrub in the hydrangea family. Although specific habitat information is not available for Nevada (Morefield 2001), in Utah the species occurs with chokecherry, mountain mahogany, jointfir (*Ephedra* spp.), and sagebrush in crevices in limestone cliffs at 6,560-10,800 ft. Threats to basin jamesia include mining.

## **Lathyrus grimesii (Grimes lathyrus)**

### ***Status***

Grimes lathyrus is considered imperiled globally (G2) and in Nevada (S2).

### ***Distribution***

Grimes lathyrus is documented only from a small portion of the northern Independence Range and southern Bull Run Mountains of north-central Elko County, Nevada.

### ***Habitat Associations/Natural History and Threats***

Grimes lathyrus is a perennial forb in the pea family. The species occurs within sparse to moderate vegetation consisting of antelope bitterbrush (*Purshia tridentata*), rubber rabbitbrush (*Ericameria nauseosa*), mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*), basin wildrye (*Leymus cinereus*), cheatgrass (*Bromus tectorum*), and occasionally leafy spurge (*Euphorbia esula*), and Leiberg's clover (*Trifolium leibergii*). Within this habitat, Grimes lathyrus occurs on mostly steep slopes of all aspects at 6,000-8,300 ft. elevation (Morefield 2001). Threats to Grimes lathyrus include livestock grazing, mineral exploration and development, slope destabilization and erosion caused by roads and other disturbances, road maintenance, concentrated trampling by livestock or feral horses, fire, competition with invasive non-native plants, and declines in insect pollinator populations (NatureServe 2013).

## **Lewisia maguirei (Maguire lewisia)**

### ***Status***

Maguire lewisia is considered critically imperiled globally (G1) and in Nevada (S1).

### ***Distribution***

Maguire lewisia is a Nevada endemic whose distribution is apparently restricted to the Quinn Canyon and Grant Ranges in eastern Nye County, Nevada.

### ***Habitat Associations/Natural History and Threats***

Maguire lewisia is a perennial forb in the purslane family. The species occurs within the pinyon-juniper zone in association with desert fraseria (*Frasera albomarginata*), Torrey's milkvetch (*Astragalus calycosus*), stemless four-nerve daisy (*Hymenoxys acaulis*), Nevada onion (*Allium nevadense*), and rock goldenrod (*Petradoria pumila*) on dry, sparsely vegetated carbonate scree or shallow gravelly-clay soils on steep slopes and ridgelines of all aspects at elevations of 7,360-8,280 ft. (Morefield 2001). Primary threats to Maguire lewisia include horticultural collection, mineral exploration and climate change (NatureServe 2013).

## **Penstemon concinnus (Elegant penstemon)**

### ***Status***

Elegant penstemon is considered vulnerable globally (G3) and imperiled in Nevada (S2).

### ***Distribution***

Elegant penstemon is documented from Lincoln and White Pine Counties, Nevada, and from Beaver, Iron, and Millard Counties, Utah.

### ***Habitat Associations/Natural History and Threats***

Elegant penstemon is a perennial subshrub in the plantain family. The species occurs within pinyon-juniper woodlands on alluvial, calcareous, and igneous gravels between 5,925 and 7,700 ft. (Franklin 1999). Threats to elegant penstemon include livestock grazing, recreational activities, road maintenance, and mining.

### **Penstemon moriahensis (Mt. Moriah penstemon)**

#### ***Status***

Mt. Moriah penstemon is considered critically imperiled to imperiled globally (G1G2) and in Nevada (S1S).

#### ***Distribution***

Mt. Moriah penstemon is endemic to White Pine County, Nevada. The species occurs mainly in the northern Snake Range near Mount Moriah, with one outlying site documented in the Kern Range and one in the White Pine Range.

#### ***Habitat Associations/Natural History and Threats***

Mt. Moriah penstemon is a perennial forb in the plantain family. The species occurs in the subalpine conifer, subalpine sagebrush, mountain mahogany, and upper pinyon-juniper zones at elevations of 7,100-10,800 ft. on open, gravelly and/or silty carbonate soils in drainages, on gentle slopes, and on road banks or other recovering disturbances with enhanced runoff (Morefield 2001). Mining has been identified as a potential threat to Mt. Moriah penstemon.

### **Penstemon pudicus (Bashful penstemon)**

#### ***Status***

Bashful penstemon is considered critically imperiled globally (G1) and in Nevada (S1).

#### ***Distribution***

Bashful penstemon is a Nevada endemic that is documented from the Kawich Range in Nye County, Nevada, where fewer than 1000 individuals are thought to occur (NatureServe 2013).

#### ***Habitat Associations/Natural History and Threats***

Bashful penstemon is a perennial forb in the plantain family. The species occurs within the subalpine sagebrush, mountain mahogany, and upper pinyon-juniper zones at elevations of 7,500-9,000 ft. in crevices, soil pockets, and coarse rocky soils of felsic volcanic outcrops, boulder piles, steep protected slopes, and drainage bottoms, mostly on north and east aspects (Morefield 2001). Specific threats have not been identified for this species.

## **Phacelia inconspicua (Inconspicuous phacelia)**

### ***Status***

Inconspicuous phacelia is considered imperiled globally (G2) and critically imperiled in Nevada (S1).

### ***Distribution***

Inconspicuous phacelia is documented from six sites in Idaho and one in the West Humboldt Mountains of Nevada (NatureServe 2013).

### ***Habitat Associations/Natural History and Threats***

Inconspicuous phacelia is an annual forb in the waterleaf family. The species occurs in small clearings within shrublands dominated by mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) on relatively deep, undisturbed, highly organic soils on concave slopes where snow drifts persist well into spring (Morefield 2001). Inconspicuous phacelia is documented from elevations of 5,000-8,280 ft. Threats to inconspicuous phacelia in Nevada include mineral exploration and development, fire suppression and catastrophic wildfire, competition from invasive weeds, and concentrated trampling by livestock and feral horses (Morefield 2001).

## **Phacelia minutissima (Small-flower phacelia)**

### ***Status***

Least phacelia is an R4 sensitive species that is considered globally vulnerable (G3) and imperiled in Nevada (S2).

### ***Distribution***

Least phacelia is a regional endemic that is documented from Nevada, Idaho, Oregon, and Washington. Within Nevada, the species is documented from Elko and Eureka Counties.

### ***Habitat Associations/Natural History and Threats***

Least phacelia is an annual forb in the waterleaf family. Within Nevada, the species occurs in the following habitats: within sagebrush swales; along the high water lines of creek beds; around springs; at the perimeter of corn lily (*Veratrum californicum*), mule ears (*Wyethia amplexicaulis*) and/or aspen stands; and in vernaly saturated summer drying mud banks in meadows (Morefield 2001). The elevation range of least phacelia is approximately 6,240-8,900 ft. Threats to least phacelia include mining activities, recreation, construction and maintenance of trails and roads, off road vehicle use, water development, competition from non-native species, herbicide application, and domestic livestock grazing.

## **Polyctenium williamsiae (Williams combleaf)**

### ***Status***

Williams combleaf is considered imperiled globally (G2) and in Nevada (S2).

### ***Distribution***

Williams combleaf occurs in California, Oregon, and Nevada. Within Nevada, the species is documented from Douglas, Lyon, Mineral, Nye, and Washoe Counties.

### ***Habitat Associations/Natural History and Threats***

Williams combleaf is a perennial forb in the mustard family. In Nevada, the species is aquatic or wetland dependent and occurs in the sagebrush, pinyon-juniper, and mountain sagebrush zones on relatively barren sandy to sandy-clay or mud margins and bottoms of non-alkaline seasonal lakes perched over volcanic bedrock (Morefield 2001). Williams combleaf is documented from elevations of 5,670-8,930 ft. Threats to Williams combleaf include grazing by livestock, feral horses, and wildlife, water diversions and developments, and off-road vehicle use (NatureServe 2013).

### ***Potentilla johnstonii (Sagebrush cinquefoil)***

#### ***Status***

Sagebrush cinquefoil is considered critically imperiled globally (G1) and in Nevada (S1)

#### ***Distribution***

Sagebrush cinquefoil is documented from a single location near a frequently traveled National Forest road on Cherry Creek Summit in the Quinn Canyon Range in Nye County, Nevada (NatureServe 2013).

### ***Habitat Associations/Natural History and Threats***

Sagebrush cinquefoil is a perennial forb in the rose family. The species occurs in pinyon-juniper vegetation with a sagebrush understory at an elevation of 7,600 ft. Although documented threats have not been identified for this species, because plants in the known location occur along a road within a dispersed camping site, potential threats to sagebrush cinquefoil include the following: trampling and crushing from dispersed camping; competition from invasive species that may be transported to the area on vehicles, equipment, footwear, or clothing; and road maintenance.

### ***Sphaeralcea caespitosa var. williamsiae (Railroad Valley globemallow)***

#### ***Status***

Railroad Valley globemallow is considered imperiled globally (G2T2) and in Nevada (S2).

#### ***Distribution***

Railroad Valley globemallow is endemic to Nye County, Nevada.

### ***Habitat Associations/Natural History and Threats***

Railroad Valley globemallow is a perennial subshrub in the mallow family. The species occurs on shallow, gravelly soils of alluvial fans or valley fill and is documented from an elevation range of 4,770- 5,310 ft. (Holmgren et al 2005). Threats to Railroad Valley globemallow include changes in land use, industrial expansion, and mineral exploration and development or leasing.

### **Townsendia jonesii var. tumulosa (Charleston ground daisy)**

#### ***Status***

Charleston ground daisy is considered vulnerable globally (G4T3) and in Nevada (S3).

#### ***Distribution***

Charleston ground daisy is a Nevada endemic that is documented from Clark and Nye Counties.

#### ***Habitat Associations/Natural History and Threats***

Charleston ground daisy is a perennial forb in the sunflower family. The species occurs in the lower sagebrush and upper shadscale/mixed-shrub zones on knolls of calcareous silty deposits and in the montane conifer, pinyon-juniper, mountain mahogany, and lower subalpine conifer zones in open, sparsely vegetated calcareous areas (Morefield 2001). Charleston ground daisy is documented from an elevation range of 5,200-11,060 ft. Recreational use has been identified as a primary threat to the species.

### **Trifolium andinum var. podocephalum (Currant Summit clover)**

#### ***Status***

Currant Summit clover is considered imperiled globally (G3T1) and in Nevada (S1).

#### ***Distribution***

Currant Summit clover is endemic to the White Pine and Egan Ranges in Lincoln and Nye Counties, Nevada.

#### ***Habitat Associations/Natural History and Threats***

A member of the pea family, Currant Summit clover is a long-lived perennial forb that occurs in the pinyon-juniper zone on volcanic or carbonate rock at elevations of 6,900-7,400 ft. (Barneby 1989). An assessment of primary threats is not available for this species.

### **Trifolium leibergii (Leiberg's clover)**

#### ***Status***

Leiberg's clover is considered imperiled globally (G2) and in Nevada (S2).

#### ***Distribution***

Leiberg's clover is documented from the Independence and Jarbidge Mountains in Elko County, Nevada, and from Oregon.

#### ***Habitat Associations/Natural History and Threats***

Leiberg's clover is a perennial forb in the pea family. The species occurs in little sagebrush (*Artemisia arbuscula*) vegetation at elevations of 6,560-7,800 ft. on relatively barren gravel soils of crumbling volcanic outcrops, mainly on flat steep areas with northeast to southeast to southwest aspects (Morefield 2001). Threats to Leiberg's clover include off-highway vehicle use, cattle trampling and trailing through habitat, mineral exploration, and reduction or loss of native pollinators.



## **Trifolium macilentum var. rollinsii (Rollins clover)**

### ***Status***

Rollins clover is considered vulnerable to imperiled globally (G2G3) and in Nevada (G2G3).

### ***Distribution***

Rollins clover is endemic to the Toiyabe Range in Nevada.

### ***Habitat Associations/Natural History and Threats***

Rollins clover is a perennial forb in the pea family. The species occurs in mountain sagebrush, subalpine conifer, and lower alpine vegetation on concave, leeward, or otherwise moisture-accumulating areas on steep to moderate slopes of all aspects at elevations of 8,800 to 10,580 ft. (Morefield 2001). An assessment of primary threats is not available for this species.

## **Alternative A - No Action**

### **Vegetation and Soils**

#### ***Direct and Indirect Effects***

Invasive non-native plants have been identified as a significant threat to more than one-fourth of the plant species in Table 3. Under Alternative A, land use and management would continue in compliance with existing land use plans, and the introduction, spread, and treatment of invasive non-native plants would be expected to follow current trends. New infestations would be expected to be highest along roads and in areas of heaviest use or ground disturbance (such as in campgrounds, energy development sites, and areas of concentrated recreation). Sensitive plants would continue to be impacted through direct competition with invasive species for water, light, and nutrients, and by alteration of fire frequency and severity. Invasive species treatments would reduce these impacts, but the scale of invasive species infestations in the analysis area and the difficulty effectively eradicating them are such that impacts on sensitive plants from invasive species infestations could not be completely avoided. Treatment of invasive species using herbicide could impact sensitive plant species that occur in treatment areas. Species most susceptible to herbicide impacts would be those that grow in disturbed areas, such as roadsides. Currently, least phacelia is the only plant species in Table 3 for which herbicide use has been identified as a primary threat.

Under Alternative A, conifer encroachment into sagebrush would be expected to follow existing trends. Conifer encroachment into sagebrush ecosystems is common and widespread in the Intermountain West. Sagebrush vegetation types susceptible to encroachment include Wyoming sagebrush, mountain big sagebrush, and black sagebrush. The encroachment of pinyon and juniper trees into sagebrush types located within their thermal zones is well documented. Douglas fir trees are known to encroach into high elevation sagebrush types. Increasing tree cover in sagebrush communities reduces or eliminates sagebrush and reduces the herbaceous understory. Conifer encroachment into sagebrush and other shrub types that would be expected

to continue under Alternative A would likely result in a loss of individuals or occurrences of sensitive plants found in the affected sagebrush types.

National Forests have implemented and continue to implement vegetation treatments that curtail conifer encroachment into vegetation communities, including sagebrush. Treatments include but are not limited to prescribed fire, lop-and-scatter, and mechanical methods (such as mastication). These actions often coincide with Forest Service land use plans that contain objectives to maintain, restore, and/or improve sagebrush and other valued plant communities. Under Alternative A, impacts on sensitive plant species from treatments that involved prescribed fire and impacts on sensitive plant species from other vegetation treatments that involved hand or mechanical methods would be as described below for Fire and Fuels.

Although energy development has not been specifically identified as a primary threat to the plant species in Table 3, impacts could occur to any species that occurs within areas of conifer encroachment.

### ***Cumulative Effects***

Under Alternative A, current vegetation and soils management treatments, including mechanical, manual, chemical, and biological control of invasive plants and pinyon and juniper, would continue within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), and the long-term beneficial impacts of improved habitat conditions would continue to outweigh the short-term negative impacts of these activities on sensitive plants. Therefore, the direct and indirect effects of vegetation and soils management on sensitive plants in Management Zones III, IV and V from the management actions under Alternative A when combined with the past, present and reasonably foreseeable future actions would not substantially increase negative impacts on sensitive plants.

### ***Livestock Grazing***

#### ***Direct and Indirect Effects***

Under Alternative A, livestock grazing would continue under current management with no expected change in AUMs, season-of-use, or other terms, conditions, or directives delineated within grazing permits or AMPs, although administrative actions may be implemented on a case-by-case basis to attain desired rangeland conditions. Desired rangeland conditions would be managed according to existing standards and guidelines designed to maintain healthy, sustainable rangeland resources and allow for the recovery of degraded rangelands.

Effects of grazing on sensitive plants include the following: trampling, which can result in direct mortality of individuals and loss of entire occurrences; herbivory, which can result in direct mortality or reduced vitality and reproduction of individuals; alteration of habitat through soil compaction, which can reduce water infiltration and change hydrology and may render areas less suitable or unsuitable for sensitive plants; and increased competition for light, nutrients and

water through introduction or spread of non-native invasive species, which may reduce sensitive plant species abundance or result in the loss of occurrences.

The nature and extent of impacts of livestock grazing on individuals, populations, and habitat quality of sensitive plants depend on the palatability of the species, the grazing and trampling tolerance of the species, grazing intensity, timing of grazing, forage preferences of ungulates, soil conditions, and hydrology. Livestock grazing has been identified as a primary threat to more than half the sensitive plant species in table 3, including meadow pussytoes, Eastwood milkweed, broad-pod freckled milkvetch, Lamoille Canyon milkvetch, Toquima milkvetch, Currant milkvetch, Grouse Creek rockcress, slender moonwort, moosewort, Sunflower Flat buckwheat, Lewis's buckwheat, Grimes lathyrus, elegant penstemon, inconspicuous phacelia, small-flower phacelia, Williams combleaf, and Leiberg's clover.

### ***Cumulative Effects***

Although livestock grazing occurs throughout all management zones, the DEIS considers it only a “lesser threat” with respect to “relative cumulative actions” within Management Zone V and does not consider it a threat elsewhere (see Chapter 5 of the DEIS). Portions of Management Zone III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories, which could compound the effects of livestock grazing on these lands. Forest Service-administered lands within Management zones IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); see Chapter 5 of the DEIS].

Under Alternative A, livestock grazing would continue to be managed in Management Zones III, IV and V through existing grazing plans, and methods and guidelines from the existing plans would be followed to maintain ecological conditions according to Standards for Rangeland Health, which include maintaining healthy, productive and diverse populations of native plants and animals. Wild horses and burro Territories would be managed for Appropriate Management Level (refer to Wild Horse and Burro Management section below) and healthy populations of wild horses and burros to achieve a thriving natural ecological balance with respect to wildlife, livestock use, and other multiple uses. Therefore, the direct and indirect effects of livestock grazing and wild horse and burro management on sensitive plants in Management Zones III, IV and V when combined with the past, present and reasonably foreseeable future actions would not substantially increase negative impacts on sensitive plants.

## **Fire and Fuels**

### ***Direct and Indirect Effects***

Wildfire, prescribed burns, and fuels management would continue to follow current direction under Alternative A, which would impose fewer restrictions on these actions than the other alternatives. Prescribed burns and other fuels treatments involving vegetation thinning or removal (such as lop-and-scatter or mastication) could occur within a variety of vegetation types, including sagebrush. Associated impacts on plant species could include direct mortality to

individuals as a result of fire or crushing by equipment or cut vegetation. Fire-adapted plant species and plant species that favor early successional habitats could benefit. However, species dependent on mature sagebrush could be negatively affected by fire and associated changes in vegetation. Additional impacts on sensitive plant species could result from the direct and indirect effects of fire suppression. The creation of fire lines could result in direct mortality to individual plants or negative impacts associated with alteration of their habitat through soil disturbance, alteration of hydrology, and promotion of the establishment or spread of invasive non-native species. The application of fire retardant can negatively impact some plant species by killing entire plants, burning shoots and leaves, and reducing germination rates (Bell et al. 2005). Fire retardant also can have fertilizing effects and promote the spread of invasive non-native species (Bell et al. 2005). Longer term impacts on plant species could occur from fire suppression. Fire suppression may initially result in higher rates of pinyon-juniper encroachment in some areas. In the initial stages of encroachment (Phase I), fuel loadings remain consistent with the sagebrush understory. As pinyon-juniper encroachment advances (Phases II and III) and the understory begins to thin, the depleted understory causes the stands to become resistant to wildfire and further alters fire return intervals. During years of high fire danger, the resulting heavy fuel loadings in these stands can contribute to larger-scale wildfire events and confound control efforts due to extreme fire behavior. Such high-severity fires can negatively impact native plant species by promoting the establishment of exotics (Hunter et al. 2006).

Although impacts from fire and fuels management could occur to any of the sensitive plants in table 3, those for which fire has been identified as a major potential threat include Lewis's buckwheat, Grimes lathyrus, inconspicuous phacelia, and Williams combleaf. Fuels management has been identified as a potential major threat to Sunflower Flat buckwheat.

### ***Cumulative Effects***

Current wildfire suppression operations and fuels management activities would continue under Alternative A. The limitation or prohibition of the use of prescribed fire in sagebrush habitats and the sagebrush protection emphasis during wildland fire operations would not be instituted as they would be in Alternatives B, C, D, E and F. Under Alternative A, the direct and indirect effects in conjunction with the past, present and reasonably foreseeable future actions and the likelihood of increasing future fires from annual weed invasions and predicted climate change may increase loss and fragmentation of the existing sagebrush habitat from wildfire in Management Zones III, IV and V (refer to Chapter 5 of the DEIS), which could contribute to negative cumulative impacts on sensitive plants.

### ***Wild Horse and Burro Management***

#### ***Direct and Indirect Effects***

While not as widespread as livestock grazing, wild horse and burro management is still a major land use across the sagebrush biome. Horse impacts are somewhat different than cattle impacts. Horses consume more forage and remove a greater proportion of the plants they consume than

cattle or sheep, which hinders the recovery of vegetation (Menard et al. 2002). Grazing by wild horses and burros reduces shrub cover and creates more fragmented shrub canopies, which can negatively affect Greater Sage-Grouse habitat (Beever and Aldridge 2011). Additionally, sites grazed by free-roaming wild horses and burros have a greater abundance of annual invasive grasses, reduced native plant diversity and reduced grass density (Beever and Aldridge 2011), (COT 2013, pg 46). Effects of wild horses and burros on habitats may be more pronounced during periods of drought or vegetation stress (NTT 2011, pg 18).

Water must be available yearlong in horse management areas (The Wild and Free-Roaming Horses and Burros Act of 1971). As a result, riparian areas are often used year round by wild horses and burros and these areas are frequently modified with additional fencing and troughs in order to accommodate year round use. Such range improvements decrease the amount of water available within natural drainages and may negatively affect riparian habitat. According to Berger (1986), one measure of habitat quality for horses is the presence of meadows. Horse bands that spent more time foraging in meadows had higher reproductive success and meadows received the highest use in proportion to their availability.

Within the Sub-region, all Forest Service districts manage for wild horses and/or burros within established Territories. Under current direction, overall direction is to manage for healthy populations of wild horse and burros to achieve a thriving natural ecological balance with respect to wildlife, livestock use, and other multiple uses. All Forest Service Territories are managed for Appropriate Management Level (AML). Initially, AML is established in LUPs at the outset of planning and is adjusted based on monitoring data throughout the life of the plan. Loss of vegetation cover, decreased water quality, increased soil erosion, and reduced overall habitat quality can result when AMLs are exceeded. Priorities for gathering horses to maintain AML are based on population inventories, gather schedules, and budget. Gathers also are conducted in emergency situations when the health of the population is at risk for lack of forage or water. Direction for prioritizing horse gathers and maintaining AML is not based on GRSG habitat needs, although this is implicit in the Congressional directive to maintain a thriving natural ecological balance.

Alternative A does not include any GRSG goals, objectives, or management actions that specifically relate to the Wild Horse and Burro Program. Though the magnitude and spatial distribution of potential impacts of wild horse and burro management on sensitive plants are different than those expected from livestock grazing, the types of impacts are similar and include the following: trampling, which can result in direct mortality of individuals and loss of entire occurrences; herbivory, which can result in direct mortality or reduced vitality and reproduction of individuals; alteration of habitat through soil compaction, which can reduce water infiltration and change hydrology and may render areas less suitable or unsuitable for sensitive plants; and increased competition for light, nutrients and water through introduction or spread of non-native invasive species, which may reduce sensitive plant species abundance or result in the loss of occurrences.

### ***Cumulative Effects***

Portions of Management Zone III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories. Forest Service-administered lands within Management zones IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); see Chapter 5 of the DEIS]. Although livestock grazing occurs throughout all management zones and has the potential to compound the effects of wild horse and burro management on these lands, the DEIS considers wild horse and burro management only a “lesser threat” with respect to “relative cumulative actions” within Management Zone V and does not consider it a threat elsewhere (see Chapter 5 of the DEIS).

Under Alternative A, wild horse and burro Territories within Management Zone III, would be managed for Appropriate Management Level (refer to Wild Horse and Burro Management section below) and healthy populations of wild horse and burros to achieve a thriving natural ecological balance with respect to wildlife, livestock use, and other multiple uses. Within Management Zones III, IV and V, livestock grazing would continue to be managed through existing grazing plans, with methods and guidelines from the existing plans followed to maintain ecological conditions according to Standards for Rangeland Health, which include maintaining healthy, productive and diverse populations of native plants and animals. Therefore, the direct and indirect effects of wild horse and burro management and livestock grazing on sensitive plants in Management Zones III, IV and V under Alternative A when combined with the past, present and reasonably foreseeable future actions would not substantially increase negative impacts on sensitive plants.

### **Energy and Locatable Minerals Development**

#### ***Direct and Indirect Effects***

Minerals development within the sub-region consists of locatable mineral resources at various scales. Mining is primarily for gold, silver, and copper and is largely absent from the basalt-capped areas of northwestern Nevada. Leasable minerals include mineral material sales such as sand and gravel for road maintenance, and limited additional commodities such as potash. Oil and gas is in limited production occurring only in the far southeastern sub-region. Oil and gas leasing occurs over a much larger footprint in western Nevada and additional production is projected as new technologies expand recovery potential. Development of locatable and leasable mineral resources typically requires significant infrastructure and human activity for construction, operation, and maintenance.

Within the sub-region, most public lands are open to oil and gas leasing, saleable mineral material development, and solar development, although specific closures of areas to leasing such as Areas of Critical Environmental Concern (ACECs) or crucial or essential wildlife habitat exist throughout the sub-region. Lands within the sub-region are generally open to mineral location. There are specific locatable mineral withdrawals for particular rights of way, designated

wilderness areas, areas of critical environmental concern and other administrative needs, none specific to protecting Greater Sage-Grouse habitat. All locatable mineral activities are managed under the regulations at 43 CFR 3800 through approval of a Plan of Operations. Mitigation of effects to GRS and its habitat are identified through the NEPA process approving plans of operation. Goals and objectives for locatable minerals are to provide opportunities to develop the resource while preventing undue or unnecessary degradation of public lands. Within the sub-region, most areas of public land would remain open for wind development.

Under Alternative A, all energy and locatable minerals development and associated infrastructure, including power lines, roads, buildings, fences, wind turbines, solar panels, and others, would continue to be managed under current direction. As such, this alternative would be expected to cause the greatest amount of direct and indirect impacts on sensitive plant species and their habitats. Impacts on sensitive plants from energy development would be similar to those for infrastructure development and maintenance discussed under Land Uses and Realty Management below, and could include direct mortality of individual plants or occurrences, loss of habitat within the disturbance footprint of new infrastructure, and reduction or loss of pollinators. Impacts on sensitive plants also could result from temporary ground disturbance (including the construction of temporary access routes, the establishment of laydown areas, vegetation clearing, etc.), which could alter vegetation assemblages, compact soils, alter hydrology, alter sunlight penetration, impact pollinators, and promote the establishment and spread of invasive non-native plants. Energy development would comply with land use plans and environmental laws and regulations, including the National Environmental Policy Act (NEPA), which would result in the implementation of measures to avoid, minimize, or mitigate impacts on sensitive plants, as appropriate. Although conifer encroachment has not been specifically identified as a primary threat to any of the species in table 3, impacts could occur to any species that occurs within areas developed for energy.

### *Cumulative Effects*

Energy development is currently a minor threat present only in Management Zone III, but geothermal energy development potential is high throughout Management Zone IV (refer to Chapter 5 of the DEIS). Mining is common across Management Zones III and IV in Nevada and occurs at a variety of scales. Management under Alternative A would maintain the current acreage open to leasing of fluid minerals, without stipulations, and locatable mineral development, although areas closed to these activities under Alternative A include some existing ACEC designations, designated wilderness, and wilderness study areas. Current energy and minerals development activities would continue under Alternative A. The closure of areas to fluid minerals and other energy development and withdrawal of areas from mineral entry would not be instituted as they would be in Alternatives B, C, D and F. Therefore, under Alternative A, the direct and indirect effects of energy and locatable minerals development in conjunction with the past, present and reasonably foreseeable future actions may increase loss and fragmentation



of the existing sagebrush habitat in Management Zones III, IV and V (refer to Chapter 5 of the DEIS) and contribute to negative cumulative impacts on sensitive plants.

## **Land Uses and Realty Management**

### ***Direct and Indirect Effects***

Under Alternative A, land tenure adjustments would be subject to current disposal, exchange, and acquisition criteria, which include retaining lands with threatened or endangered species, high quality riparian habitat, and plant and animal populations or natural communities of high interest. Although land tenure adjustments or withdrawals made in GRSG habitat could reduce the habitat available to sustain GRSG populations, unless provisions were made to ensure that GRSG conservation remained a priority under the new land management regime, land tenure adjustments would likely include retention of areas with GRSG, and would thus retain occupied habitats under BLM or FS management. This would reduce the likelihood of habitat conversion to agriculture, urbanization, or other uses that would remove sagebrush habitat.

Direction under existing land use plans would continue to apply under Alternative A. No changes would occur to the current National Forest System infrastructure, including power lines, wind turbines, solar panels, communications towers, fences, or roads. Although mitigation is typically developed under the NEPA process and most right of way and surface developments are subject to limited operation periods or other stipulations in local GRSG conservation strategies, permitted right-of-ways (ROWs) or special use authorities (SUAs) would continue to allow construction, maintenance, and operation activities that could result in habitat loss, fragmentation, or degradation of GRSG habitat or result in barriers to migration corridors or seasonal habitats. Construction, maintenance, and use of infrastructure and ancillary facilities would continue to lead to higher short-term concentrations of disturbance in GRSG habitat.

Impacts on sensitive plants could result from construction and maintenance of infrastructure, such as power lines, communication towers, fences, and roads. Within the footprint of permanent impacts, effects on sensitive plants could include direct mortality of individual plants or occurrences, loss of habitat, and reduction or loss of pollinators. Impacts on sensitive plants also could result from temporary ground disturbance associated with the construction of temporary access routes, the establishment of laydown areas, and vegetation clearing, which could alter vegetation assemblages, compact soils, alter hydrology, alter sunlight penetration, impact pollinators, and promote the establishment and spread of invasive non-native plants. Construction and maintenance of infrastructure would comply with land use plans and environmental laws and regulations, including the National Environmental Policy Act (NEPA), which would result in the implementation of measures to avoid, minimize, or mitigate impacts on sensitive plants, as appropriate.

Sensitive plants in table 3 for which infrastructure development and/or maintenance, particularly road construction and/or maintenance, has been identified as a primary threat include meadow pussytoes, Eastwood milkweed, broad-pod freckled milkvetch, Lamoille Canyon milkvetch,



Toquima milkvetch, slender moonwort, Nevada willowherb, Sunflower Flat buckwheat, Lewis's buckwheat, Grimes lathyrus, elegant penstemon, small-flower phacelia, and sagebrush cinquefoil.

### ***Cumulative Effects***

Current lands and realty management activities would continue under Alternative A. ROW exclusion or avoidance areas would not be instituted as they would be in Alternatives B, C, D, or F. Therefore, under Alternative A, the direct and indirect effects of lands and realty management, in conjunction with the past, present and reasonably foreseeable future actions may increase loss and fragmentation of the existing sagebrush habitat in Management Zones III, IV and V (refer to Chapter 5 of the DEIS) and contribute to negative cumulative impacts on sensitive plants.

## **Travel, Transportation and Recreation Management**

### ***Direct and Indirect Effects***

Under current management, travel on most Forest Service-administered lands is limited to designated roads, although off road motorized big game retrieval within ½ mile of roads is authorized on the Mountain City, Ruby Mountains, and Jarbidge Ranger Districts of the Humboldt-Toiyabe National Forest, with some restrictions. Under Alternative A, there would be no changes to the current National Forest System Roads or transportation plans on the Humboldt-Toiyabe National Forest.

Recreation encompasses a wide range of activities, most of which involve some form of overland travel (motorized or non-motorized) and/or use of roads and/or trails. Under Alternative A, recreation would continue to be managed according to current direction. Current recreation activities would continue within GRSG habitat, and some of the areas within GRSG habitat would remain open to cross country motorized vehicle use.

In general, the more acres and miles of routes that are designated in an area, the greater the likelihood of habitat fragmentation and introduction of invasive plants within GRSG habitat. In addition, less restrictive travel conditions usually result in higher concentrations of human use adjacent to motorized routes. Impacts on sensitive plants from travel, transportation, and recreation management that would be expected under Alternative A include the following: direct mortality from trampling or crushing; reduced vitality and interference with reproduction from dust generation; habitat degradation associated with soil compaction and changes in hydrology; and reduction in abundance or loss of occurrences from the spread of invasive non-native species. Impacts on sensitive plants from development of infrastructure to support concentrated recreation activities would be as discussed for infrastructure under Land Uses and Realty Management above. Expansion or development of infrastructure to support recreation would follow existing direction and would comply with land use plans and environmental laws and regulations, including the National Environmental Policy Act (NEPA), which would result in the implementation of measures to avoid, minimize, or mitigate impacts on sensitive plants, as appropriate.

Of the sensitive plant species in table 3, recreation has been identified as a primary threat to broad-pod freckled milkvetch, Lamoille Canyon milkvetch, Currant milkvetch, moosewort, Nevada willowherb, Sunflower Flat buckwheat, Lewis's buckwheat, elegant penstemon, small-flower phacelia, Williams combleaf, sagebrush cinquefoil, Charleston ground daisy, and Leiberg's clover. Of these species, off-road vehicle use has been identified as a primary threat to Currant milkvetch, moosewort, Lewis's buckwheat, small-flower phacelia, Williams combleaf, and Leiberg's clover.

### ***Cumulative Effects***

Recreation is considered a "lesser threat" with respect to "relative cumulative actions" in the DEIS only within Management Zone V (see Chapter 5 of the DEIS). Current travel, transportation, and recreation management would continue under Alternative A. The limitation of motorized travel to existing routes and permitting of recreational SUAs that are neutral or beneficial to sage-grouse, as well as limited opportunities for road construction and upgrading of current roads, would not be instituted as they would be in Alternatives B, C, D and F. Under Alternative A, the direct and indirect effects from travel, transportation and recreation management in conjunction with the past, present and reasonably foreseeable future actions may increase loss and fragmentation of the existing sagebrush habitat in Management Zones III, IV and V (refer to Chapter 5 of the DEIS) and contribute to negative cumulative impacts on sensitive plants.

## **Alternative B**

### **Vegetation and Soils**

#### ***Direct and Indirect Effects***

Under Alternative B, invasive non-native plant species control efforts would follow current direction, and the types of direct and indirect impacts expected to sensitive plants would be the same as those discussed under Alternative A. However, vegetation management conservation measures under Alternative B would prioritize restoration efforts, including treatment of invasive non-native plants, in GRSG habitats, which would be expected to provide a long term benefit to sensitive plants that occur in those habitats. Short term impacts of invasive plant treatments and other restoration actions, particularly those that involve mechanized equipment or the use of herbicides, could negatively impact individual sensitive plants (for example, by crushing or herbicide drift). Such impacts would be expected to be minimal as project level environmental review would be done and appropriate avoidance or minimization measures would be incorporated.

Under Alternative B, the use of native seed would be favored in restoration efforts, though non-native seed could be used under certain circumstances. Current FS policy (FSM 2070.3) already restricts the use of non-native seed in restoration and prohibits the use of invasive species, so the impact of the native seed emphasis for restoration in Alternative B is unlikely to result in any additional benefit to sensitive plant species over Alternative A. Monitoring and invasive species

control after fuels treatments and at existing range improvements incorporated into Alternative B could benefit sensitive plant species by minimizing habitat degradation caused by invasive species. Overall, Alternative B would be likely to reduce impacts of invasive non-native plants on sensitive plants relative to Alternative A.

Like Alternative A, Alternative B would not directly address conifer encroachment. The types of impacts of conifer encroachment and associated management actions on sensitive plants under Alternative B would be expected to be the same as those under Alternative A; however, the conservation measures described above and the fuels treatments described in Fire and Fuels would likely reduce the magnitude of the negative impacts of conifer encroachment on sensitive plants and provide a long-term benefit to species that depend on healthy sagebrush habitats. Impacts associated with managing conifer encroachment under Alternative B would be expected to increase relative to Alternative A and could negatively impact sensitive plants that are restricted to conifer habitats.

### ***Cumulative Effects***

Under Alternative B, current vegetation and soils management treatments within Management Zones III, IV and V (refer to Chapter 5 of the DEIS) (including mechanical, manual, chemical, and biological control of invasive plants and pinyon and juniper) would continue, and the long-term beneficial impacts of improved habitat conditions would continue to outweigh the short-term negative impacts of these activities on sensitive plants. However, additional measures to conserve existing sagebrush habitat under Alternative B would provide further long-term benefits to sensitive plants within GRSG habitat. Therefore, the direct and indirect effects of vegetation and soils management on sensitive plants in Management Zones III, IV and V under Alternative B when combined with past, present and reasonably foreseeable future actions would not substantially increase negative impacts on sensitive plants.

### ***Livestock Grazing***

#### ***Direct and Indirect Effects***

Alternative B would incorporate sage grouse habitat objectives and sage grouse management considerations into livestock grazing management in PPH. Actions would include completion of range condition assessments, consideration of grazing methods and systems to reduce impacts on sage grouse habitat, modification of grazing systems to meet seasonal sage grouse habitat requirements, improved management of riparian areas and wet meadows, evaluation of existing introduced perennial grass seedings, authorization of new water developments and structural range improvements only when beneficial to GRSG, incorporation of BMPs for West Nile Virus, and fence removal, modification or marking. Although the types of impacts on sensitive plants would be expected to be the same as under Alternatives A and B, the level and extent of negative impacts would be expected to be reduced in Alternative B. Sensitive plants that occur in PPH would likely benefit from improving habitat conditions in uplands, riparian areas, meadows, and other wetlands. Almost one-fourth of the sensitive plant species in table 3 occur in riparian

areas, meadows, seeps, springs, and other wetland areas, which tend to be used more intensively by livestock than upland areas. Because of these factors and the focus of Alternative B on improving riparian, meadow, and other wetland habitat, sensitive wetland plant species may benefit from Alternative B more than upland species.

### ***Cumulative Effects***

Although livestock grazing occurs throughout all management zones, the DEIS considers it a “lesser threat” with respect to “relative cumulative actions” within Management Zone V and does not consider it a threat elsewhere (see Chapter 5 of the DEIS). Portions of Management Zone III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories, which could compound the effects of livestock grazing on these lands. Forest Service-administered lands within Management zones IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); see Chapter 5 of the DEIS].

Under Alternative B, livestock grazing would continue to be managed through existing grazing plans and wild horse and burro Territories would be managed for Appropriate Management Level within Management Zones III, IV and V (refer to Chapter 5 of the DEIS). Additional measures to conserve existing sagebrush habitat under Alternative B would further minimize negative impacts on sensitive plants that occurred within GRSG habitat. Therefore, the direct and indirect effects of livestock grazing and wild horse and burro management on sensitive plants in Management Zones III, IV and V under Alternative B when combined with past, present and reasonably foreseeable future actions would not substantially increase negative impacts on sensitive plants.

### **Fire and Fuels**

#### ***Direct and Indirect Effects***

Under Alternative B, fire suppression would be prioritized in PPH to protect mature sagebrush habitat. Suppression would be prioritized in PGH only where fires threatened PPH. Alternative B does not include any other specific wildland fire management actions in PGH. Under Alternative B, fuels treatments would be designed to protect sagebrush ecosystems by maintaining sagebrush cover, carefully evaluating the need for fuel breaks against additional sagebrush losses, applying seasonal restrictions for implementing management treatments, limiting fuels treatments in winter range, and emphasizing the use of native seed in restoration. Post-fuels treatments in PPH would be designed to ensure long-term persistence of seeded areas and native plants and maintain 15 percent canopy cover. Fuels treatments in PPH would include monitoring and control of invasive non-native plants species, and fuels management BMPs in PPH would incorporate invasive plant prevention measures.

The types of impacts on sensitive plants associated with fire and fuels under Alternative B would be similar to those under Alternative A; however the extent of those impacts and their distribution across the landscape would change. Under Alternative B, sensitive plant species

requiring mature sagebrush would be expected to benefit from fire and fuels activities, and sagebrush species that require early successional sagebrush and those that are fire adapted or fire dependent may experience a reduction in suitable habitat over time. With its emphasis on minimizing fire in mature sagebrush, impacts on sensitive plants from suppression would be higher under Alternative B than under Alternative A. Because reseeding efforts would prioritize use of native seed in PPH over other areas in years of short seed supplies, sensitive plants in areas outside PPH could be more susceptible to habitat degradation from wildfire if limited seed availability reduced revegetation success outside PPH.

### ***Cumulative Effects***

Under Alternative B, management actions associated with fire and fuels would increase protection of GRSG habitat, primarily within PPH. Under Alternative B, current wildfire suppression operations within Management Zones III, IV and V (refer to Chapter 5 of the DEIS) would continue, however, additional emphasis would be placed on protecting existing sagebrush habitat during suppression activities, pre-suppression planning, and staging. Fuels treatment activities would focus on protecting Greater Sage-Grouse habitat, primarily within PPH. Therefore, the direct and indirect effects of fire and fuels management on GRSG habitat in Management Zones III, IV and V under Alternative B, which would be largely beneficial to GRSG habitat and the sensitive plants that occur within it, when combined with the past, present and reasonably foreseeable future actions would not substantially increase negative impacts on sensitive plants.

### **Wild Horse and Burro Management**

#### ***Direct and Indirect Effects***

Under Alternative B, wild horses and burros would be managed at established Appropriate Management Levels (AMLs) on the same number of acres as under Alternative A, and gathers would be prioritized in PPH unless needed in other areas to address catastrophic environmental issues. Wild Horse Territory Plans (WHT) Plans would incorporate GRSG habitat objectives. Implementation of any range improvements would follow the same guidance identified for livestock grazing in this alternative, including designing and locating new improvements only where they conserve, enhance, or restore Greater Sage-Grouse habitat through improved grazing management. Design features could include developing or modifying waters to mitigate for West Nile virus, removing or modifying fences to reduce the chance of bird strikes, and monitoring and treating invasive species associated with range improvements. In comparison to Alternative A, Alternative B would prioritize GRSG habitat objectives in WHT Plans and base AML numbers on GRSG habitat needs.

Although the types of impacts on sensitive plants would be expected to be the same under Alternatives A and B, the level and extent of negative impacts would be expected to be reduced under Alternative B. Sensitive plants that occur in PPH would likely benefit from prioritized

gathers in PPH, the incorporation of GRS habitat objectives in WHT Plans, and guidance for implementing range improvements.

### ***Cumulative Effects***

Portions of Management Zone III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories. Forest Service-administered lands within Management zones IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); see Chapter 5 of the DEIS]. Although livestock grazing occurs throughout all management zones and has the potential to compound the effects of livestock grazing on these lands, the DEIS considers it a “lesser threat” with respect to “relative cumulative actions” only within Management Zone V and does not consider it a threat elsewhere (see Chapter 5 of the DEIS).

Under Alternative B, wild horse and burro Territories would continue to be managed for Appropriate Management Level and livestock grazing would continue to be managed through existing grazing plans within Management Zones III, IV and V (refer to Chapter 5 of the DEIS). Additional measures to conserve existing sagebrush habitat under Alternative B would reduce overall negative impacts on sensitive plants within GRS habitat. Therefore, the direct and indirect effects of livestock grazing and wild horse and burro management on sensitive plants in Management Zones III, IV and V under Alternative B when combined with past, present and reasonably foreseeable future actions would not substantially increase negative impacts on sensitive plants.

## **Energy and Locatable Minerals Development**

### ***Direct and Indirect Effects***

Alternative B addresses energy development directly through its inclusion of provisions for fluid energy development. Actions within Alternative B relevant to the analysis of impacts on sensitive plants include the following: closing PPH to fluid mineral leasing with possible exceptions; allowing geophysical operations in PPH only to obtain information about areas outside and adjacent to PPH; requiring exploratory operations within PPH to be done using helicopter-portable drilling methods and in accordance with seasonal timing restrictions and/or other restrictions that may apply; in PPH prohibiting new surface occupancy on federal leases; for existing leases entirely within PPH, applying NSO buffers around leks, and if the entire lease falls within this buffer, limiting disturbances within sections to the 3% threshold; applying BMPs to limit the impact of operations on PPH; and applying BMPs to improve reclamation standards and successfully restore PPH. All of these actions would be likely to reduce the level of impacts of fluid mineral development on sensitive plants relative to Alternative A.

Although Alternative B does not directly address wind energy development or industrial solar development, its 3% threshold for anthropogenic disturbances would apply to energy development and would limit the extent of all types of energy development in PPH. Impacts on



sensitive plants would be as discussed below for infrastructure under Land Uses and Realty Management.

### ***Cumulative Effects***

Energy development is currently a minor threat present only in Management Zone III, but geothermal energy development potential is high throughout Management Zone IV (refer to Chapter 5 of the DEIS). Mining is common across Management Zones III and IV in Nevada and occurs at a variety of scales. Under Alternative B, some of the current energy and locatable minerals management direction would continue within Management Zones III and IV, however, additional measures would conserve existing sagebrush habitat by adding all PPH to existing closures and proposing it for withdrawal. Therefore, the direct and indirect effects on sensitive plants in GRSG habitat in Management Zones III, IV and V from the management actions associated with energy and locatable minerals development under Alternative B, which would minimize negative impacts to sensitive plants in GRSG habitat, when combined with the past, present and reasonably foreseeable future actions would not substantially increase negative impacts on sensitive plants.

## **Land Uses and Realty Management**

### ***Direct and Indirect Effects***

Under Alternative B, all PPH would be managed as exclusion areas, PGH would be managed as an avoidance area for new ROW and SUA projects, and co-location of new ROWs or SUAs with existing infrastructure would occur in PPH and PGH. Alternative B also would entail the following within PPH: co-location of new ROWs or SUAs with existing infrastructure; removal, burying, or modification of existing power lines; co-location of new facilities with existing facilities, where possible; use of existing roads, or realignments to access valid existing rights that are not yet developed, or constructing new roads to the absolute minimum standard necessary if valid existing rights could not be accessed via existing roads; and the establishment of a 3% threshold on anthropogenic disturbance (including, but not limited to, highways, roads, geothermal wells, wind turbines, and associated facilities). In addition, Alternative B would contain provisions to retain public ownership of priority sage-grouse habitat and to acquire state and private lands with intact subsurface mineral estate where suitable conservation actions for GRSG could not otherwise be achieved.

Alternative B would benefit sensitive plants within PPH and PGH by maximizing habitat connectivity and minimizing habitat loss, fragmentation, degradation and disturbance. Under Alternative B, infrastructure related impacts on sensitive plant species could include direct mortality, loss or degradation of habitat, and loss or reduction of pollinators. Although the types of infrastructure related impacts would be similar to those under Alternative A, the 3% threshold that Alternative B would place on anthropogenic disturbance within PPH would likely reduce the extent of those impacts in PPH. As a result, limitations on disturbances could benefit individuals and occurrences of sensitive plants within PPH. Sensitive plants outside PPH would likely

experience little change in direct or indirect effects. However, if the 3% development threshold ended up concentrating new infrastructure development outside PPH rather than just reducing it within PPH, the extent of impacts on sensitive plants outside PPH could increase under Alternative B relative to Alternative A. The proposal under Alternative B to potentially bury some existing power lines that cross PPH could impact sensitive plant species through direct mortality and/or degradation of habitat; however, because such actions would undergo site specific environmental review, including NEPA, measures to avoid, minimize, or mitigate impacts on sensitive plants would be incorporated, as appropriate.

### ***Cumulative Effects***

Management actions associated with lands and realty under Alternative B would increase protection of Greater Sage-Grouse habitat and provide an overall benefit to sensitive plants that occur within it. Under Alternative B, some of the current land and realty operations would continue within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), however, additional measures would conserve existing sagebrush habitat. Lands and realty management activities would focus ROW exclusion or avoidance areas in Greater Sage-Grouse habitat. Therefore, the direct and indirect effects of lands and realty management on sensitive plants in Management Zones III, IV and V under Alternative B, which would provide an overall benefit to sensitive plants in GRSG habitat, when combined with the past, present and reasonably foreseeable future actions, would not substantially increase negative impacts on sensitive plants.

## **Travel, Transportation and Recreation Management**

### ***Direct and Indirect Effects***

Under Alternative B, motorized travel in PPH would be limited to designated roads, primitive roads, and trails at a minimum. Only Recreation Special Use Authorizations (RSUAs) that were neutral or beneficial to sage-grouse would be permitted in PPH. In addition, opportunities for road construction in PPH would be limited, minimum standards would be applied, existing roads in PPH could not be upgraded, and cross country driving would be prohibited in PPH. Although the types of impacts on sensitive plants would be similar under Alternatives A and B, the degree and extent of impacts within PPH would be reduced under Alternative B. The types of impacts that would be expected to decrease would include direct mortality from crushing or trampling individuals, negative impacts associated with dust generation, habitat degradation associated with soil compaction and changes in hydrology, and negative impacts associated with spread of invasive non-native species.

### ***Cumulative Effects***

The DEIS considers recreation only a “lesser threat” with respect to “relative cumulative actions” within Management Zone V and does not consider it a threat elsewhere (see Chapter 5 of the DEIS). Management actions associated with travel, transportation and recreation under Alternative B would increase protection of Greater Sage-Grouse habitat, primarily within PPH, and minimize the negative impacts of recreation and travel management on sensitive plants that



occur within those areas. Under Alternative B, some of the current travel, transportation and recreation management direction would continue within Management Zones III, IV and V, however, additional measures to conserve existing sagebrush habitat would be included. Because Alternative B would minimize the negative impacts of travel, transportation, and recreation management on sensitive plant species in Management Zones III, IV and V, when combined with the past, present and reasonably foreseeable future actions this alternative would not substantially increase negative impacts on sensitive plant species.

## Alternative C

### Vegetation and Soils

#### *Direct and Indirect Effects*

Under Alternative C, invasive non-native plant control efforts would follow current direction, and the types of direct and indirect impacts expected to sensitive plants would be the same as those discussed under Alternative A. Like Alternative B, vegetation management conservation measures under Alternative C would prioritize restoration efforts, including treatment of invasive non-native plants, in GRSG habitats, which would be expected to provide a long-term benefit to sensitive plants that occur in those habitats. Unlike Alternative B, Alternative C would extend this focus beyond PPH to all occupied GRSG habitat. As a result, sensitive plants outside PPH but within occupied GRSG could experience a long-term benefit under Alternative C that they would not under Alternative B. Under Alternative C, short-term impacts of invasive plant treatments and other restoration actions, particularly those that involve mechanized equipment or the use of herbicides, could negatively impact individual sensitive plants (for example, by crushing or herbicide drift). Such impacts would be expected to be minimal as project level environmental review would be done and appropriate avoidance or minimization measures would be incorporated. The use of native seed would be favored in restoration under Alternative C, as it would be under Alternative B. Current FS policy (FSM 2070.3) already restricts the use of non-native seed in restoration and prohibits the use of invasive species, so the impact of the native seed emphasis for restoration in Alternative C is unlikely to result in a measurable additional benefit to sensitive plant species over Alternatives A or B. Monitoring and invasive species control after fuels treatments under Alternative C could benefit sensitive plant species by minimizing habitat degradation caused by invasive species. Overall, Alternative C would be likely to reduce impacts of invasive non-native plants on sensitive plants relative to Alternative A and may provide a marginal benefit over Alternative B.

Like Alternatives A and B, Alternative C does not directly address conifer encroachment. The types of impacts of conifer encroachment and associated management actions on sensitive plants under Alternative C would be expected to be the same as those under Alternative A; however, the conservation measures described above for invasive plants and the fuels treatments described below in Fire and Fuels would likely reduce the magnitude of the impacts of conifer encroachment on sensitive plants relative to Alternative A. Because those measures generally

would apply throughout occupied GRSG under Alternative C whereas they would be limited to PPH under Alternative B, Alternative C could provide an additional reduction in the magnitude of impacts on sensitive plants from conifer encroachment relative to Alternative B. Because conifer encroachment measures would be applied over a larger area under Alternative C, negative impacts to sensitive plants from encroachment management discussed under Alternative A would be expected to be higher under Alternative C than under Alternatives A or B.

### ***Cumulative Effects***

Under Alternative C, current vegetation and soils management treatments, including mechanical, manual, chemical, and biological control of invasive plants and pinyon and juniper, would continue within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), and the long-term beneficial impacts of improved habitat conditions would continue to outweigh the short-term negative impacts of these activities on sensitive plants. However, additional emphasis on protecting existing sagebrush habitat under Alternative C would provide an additional long-term benefit to sensitive plants within GRSG habitat. Therefore, the direct and indirect effects of vegetation and soils management on sensitive plants in Management Zones III, IV and V under Alternative C when combined with the past, present and reasonably foreseeable future actions would not substantially increase negative impacts on sensitive plants.

### ***Livestock Grazing***

#### ***Direct and Indirect Effects***

Alternative C would prohibit grazing in all occupied GRSG habitat and remove all livestock water troughs, pipelines, and wells from occupied GRSG habitat. Sensitive plants that occur in occupied GRSG habitat could benefit from improving habitat conditions in uplands, riparian areas, meadows, and other wetlands by the elimination of negative impacts discussed under Livestock Grazing for Alternative A. Sensitive species in table 3 for which livestock grazing was identified as a major threat might be expected to benefit most from Alternative C. These species include meadow pussytoes, Eastwood milkweed, broad-pod freckled milkvetch, Lamoille Canyon milkvetch, Toquima milkvetch, Currant milkvetch, Grouse Creek rockcress, slender moonwort, moosewort, Sunflower Flat buckwheat, Lewis's buckwheat, Grimes lathyrus, elegant penstemon, inconspicuous phacelia, small-flower phacelia, Williams combleaf, and Leiberg's clover. Of these species, almost 30% (meadow pussytoes, Lamoille Canyon milkvetch, slender moonwort, moosewort, and small-flower phacelia) occur in, meadows, seeps, springs, and other wetland areas, which tend to be used more intensively by livestock than upland areas. As a result, the greatest benefit to sensitive plants from the elimination of grazing in occupied GRSG habitat may be to meadow pussytoes, Lamoille Canyon milkvetch, slender moonwort, moosewort, and small-flower phacelia.

Total elimination of grazing from occupied GRSG habitat may result in additional indirect impacts on occupied GRSG habitats, surrounding areas, and the sensitive plants that occupy them. Moderate grazing reduces herbaceous fuel loads on sagebrush steppe rangelands and is

considered likely to reduce the probability and severity of wildfires and the continuity and size of burned areas (Davies et al. 2010). Thus the elimination of grazing could benefit fire adapted, fire dependent, and early successional sensitive plants that occur in currently grazed occupied GRSG habitats and adjacent areas. For sensitive plants that are not fire tolerant and/or require mature sagebrush habitat, negative impacts associated with the elimination of grazing could occur from wildfire in occupied sagebrush habitats and adjacent areas. The types of beneficial and negative impacts on sensitive plants would be as described under Fire and Fuels for Alternative A, though their extent and distribution across the landscape would likely differ.

### ***Cumulative Effects***

Although livestock grazing occurs throughout all management zones, the DEIS considers it only a “lesser threat” with respect to “relative cumulative actions” within Management Zone V and does not consider it a threat elsewhere (see Chapter 5 of the DEIS). Under Alternative C, livestock grazing within Management Zones III, IV and V (refer to Chapter 5 of the DEIS) would be eliminated within all occupied GRSG habitat, providing a net benefit to sensitive species that occur there. Therefore, the direct and indirect effects of livestock grazing on sensitive plant species in Management Zones III, IV and V under Alternative C when combined with the past, present and reasonably foreseeable future actions would not substantially increase negative impacts on sensitive plants.

## **Fire and Fuels**

### ***Direct and Indirect Effects***

The types of fire and fuels related impacts of Alternative C on sensitive plants would be similar to those discussed for Alternative B; however because Alternative C expands most GRSG conservation elements to all occupied habitat rather than limiting them to PPH, the area over which those impacts could occur would be larger. Elements of Alternative C that would be the most likely change the extent of direct and indirect beneficial and negative impacts on sensitive plants relative to Alternative B include prioritizing suppression in all occupied habitat rather than limiting it to PPH and applying fuels management treatment provisions (including post-fire revegetation and invasive species control) to all occupied GRSG habitat rather than limiting them to PPH. Additional fire and fuels related impacts on sensitive plant species could result from the increased fire risk associated with the elimination of grazing. Those impacts are discussed above under Livestock Grazing.

### ***Cumulative Effects***

The cumulative effects of management actions related to fire and fuels under Alternative C when combined with the past, present and reasonably foreseeable future actions would be similar to those described for Alternative B and would not be expected to substantially increase negative impacts on sensitive plants within Management Zones III, IV and V (refer to Chapter 5 of the DEIS).

## **Wild Horse and Burro Management**

### ***Direct and Indirect Effects***

Under Alternative C, wild horses and burros would be managed at AML. However, AML establishment would be analyzed in conjunction with livestock numbers during grazing permit renewals. Combined with the removal of some fences during active restoration processes related to livestock grazing, horses and burros would be expected to range over a larger area than under Alternative A and would necessitate the need for increased gather schedules.

The types of impacts of wild horse and burro management on sensitive plants under Alternative C would be expected to be the same as under Alternatives A and B; however their magnitude and spatial distribution would differ. The increase in access to riparian and upland habitats that are currently protected by fences, expected temporary increases in horses and burros over AML, and anticipated changes in water holding capacities of riparian areas under Alternative C could increase impacts to sensitive plants relative to Alternatives A and B through the following: increased trampling, which can result in direct mortality of individuals and loss of entire occurrences; increased herbivory, which can result in direct mortality or reduced vitality and reproduction of individuals; alteration of habitat through soil compaction, which can reduce water infiltration and change hydrology and may render areas less suitable or unsuitable for sensitive plants; and increased competition for light, nutrients and water through introduction or spread of non-native invasive species, which may reduce sensitive plant species abundance or result in the loss of occurrences.

### ***Cumulative Effects***

Portions of Management Zone III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories. Forest Service-administered lands within Management zones IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); see Chapter 5 of the DEIS]. Under Alternative C, wild horse and burro Territories would be managed for AML as under current management, however, there would be fewer restrictions on wild horse and burro movement than under Alternative A. Therefore, the direct and indirect effects of wild horse and burro management under Alternative C in conjunction with the past, present and reasonably foreseeable future actions may increase loss and fragmentation of the existing sagebrush habitat in Management Zones III, IV and V (refer to Chapter 5 of the DEIS) and contribute to negative cumulative impacts on sensitive plants.

## **Energy and Locatable Minerals Development**

### ***Direct and Indirect Effects***

The types of impacts on sensitive plants from energy development under Alternative C would be the same as described above under Alternatives A and B, though their magnitude and spatial distribution would differ. Alternative C would extend some of Alternative B's provisions to all occupied GRSG habitat rather than limiting them to PPH. Actions within Alternative C relevant

to the analysis of impacts on sensitive plants include the following: closing occupied GRSG habitat to fluid mineral leasing, with possible exceptions; allowing geophysical operations in occupied GRSG habitat only to obtain information about areas outside and adjacent to PPH; requiring exploratory operations within occupied GRSG habitat to be done using helicopter-portable drilling methods and in accordance with seasonal timing restrictions and/or other applicable restrictions; in occupied GRSG habitat prohibiting new surface occupancy on federal leases; and for existing leases entirely within occupied GRSG habitat, applying NSO buffers around leks, and if the entire lease falls within this buffer, limiting disturbances within sections to the 3% threshold. All of these actions would be likely to reduce the level of impacts of fluid mineral development on sensitive plants relative to Alternative A. Since these actions would apply to all occupied GRSG habitat rather than just PPH, they also could reduce the level of impacts of fluid mineral development on sensitive plants relative to Alternative B.

Unlike Alternative B, Alternative C directly addresses solar energy development by prohibiting it in occupied GRSG habitat and requiring it to be sited at least five miles from active sage grouse leks. These actions could reduce negative impacts associated with energy development on sensitive plants that occur in occupied GRSG habitat relative to Alternative A. They also could reduce negative impacts associated with energy development in occupied GRSG outside PPH relative to Alternative B.

In addition to provisions in Alternative C that specifically address energy development, the 3% threshold for anthropogenic disturbances would limit the extent of all types of energy development in occupied GRSG habitat. Impacts on sensitive plants would be as discussed above for infrastructure under Land Uses and Realty Management for Alternative C.

### ***Cumulative Effects***

Energy development is currently a minor threat present only in Management Zone III, but geothermal energy development potential is high throughout Management Zone IV (refer to Chapter 5 of the DEIS). Mining is common across Management Zones III and IV in Nevada and occurs at a variety of scales. Under Alternative C, some of the current energy and locatable minerals management direction would continue within Management Zones III and IV, however, additional measures would conserve existing sagebrush habitat by adding all occupied habitat to existing closures and proposing it for withdrawal. Therefore, the direct and indirect effects of energy and locatable minerals development on sensitive plants in Management Zones III, IV and V under Alternative C when combined with the past, present and reasonably foreseeable future actions would not substantially increase negative impacts on sensitive plants (refer to Chapter 5 of the DEIS).

## **Land Uses and Realty Management**

### ***Direct and Indirect Effects***

As with Alternative A, impacts from land uses and realty management on sensitive plant species under Alternative C could include direct mortality, loss or degradation of habitat, and loss or

reduction of pollinators. The extent of these impacts would be expected to be less overall than under Alternatives A and B. Under Alternative C, new transmission corridors, new ROWs for corridors, and new communication towers would be prohibited in occupied GRSG habitat and would be sited outside occupied GRSG habitat and bundled with existing corridors to the maximum extent possible. As for Alternative B, the proposal under Alternative C to potentially bury some existing power lines in occupied GRSG habitat could impact sensitive plant species through direct mortality and/or degradation of habitat. Because the undergrounding of power lines could occur within a larger area than under Alternative B, which focuses on PPH, more sensitive plant species or occurrences could be impacted. However, such impacts would be minimized or avoided because the burial of power lines would undergo site specific environmental review, including NEPA, and conservation measures or design features would be applied for sensitive plants.

In addition to the above measures, which focus on specific types of infrastructure, Alternative C is similar to Alternative B in placing a 3% threshold on anthropogenic disturbance. However, Alternative C would apply that threshold throughout occupied GRSG habitat rather than limiting it to PPH, as Alternative B would. Although under Alternative C the types of infrastructure related impacts would be similar to those under Alternative A, the 3% threshold that Alternative C would place on anthropogenic disturbance within GRSG habitat would likely reduce the extent of those impacts in those areas. As a result, limitations on disturbances could benefit individuals and occurrences of sensitive plants within occupied GRSG habitat. Sensitive plants outside occupied GRSG habitat would likely experience little change in direct or indirect effects. However, if the 3% development threshold ended up concentrating new infrastructure development outside occupied GRSG habitat rather than just reducing it within such habitat, the extent of impacts on sensitive plants outside occupied GRSG habitat could increase under Alternative C relative to Alternative A.

### ***Cumulative Effects***

Management actions associated with lands and realty under Alternative C would increase protection of Greater Sage-Grouse habitat and provide an overall long-term benefit to the sensitive plants that occur there. Under Alternative C, some of the current land and realty operations would continue within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), however, measures would be added to conserve existing sagebrush habitat. Lands and realty management activities would focus ROW exclusion or avoidance areas in Greater Sage-Grouse habitat. Therefore, the direct and indirect effects of lands and realty management on sensitive plants in Management Zones III, IV and V under Alternative C, which would provide an overall benefit to sensitive plants in GRSG habitat, when combined with the past, present and reasonably foreseeable future actions would not substantially increase negative impacts on sensitive plants.



## **Travel, Transportation and Recreation Management**

### ***Direct and Indirect Effects***

Similar to Alternative B, Alternative C would allow Recreation Special Use Authorizations (RSUAs) that were neutral or beneficial to GRSG, but Alternative C would extend this provision to all occupied habitat rather than restricting it to PPH. Opportunities for road construction in occupied GRSG habitat would be limited, minimum standards would be applied, existing roads could not be upgraded, and cross country driving would be prohibited in occupied GRSG habitat. Although the types of impacts on sensitive plants would be similar under Alternatives A, B, and C, the degree and extent of impacts within occupied GRSG habitat would be reduced under Alternative C relative to Alternative A. The degree and extent of impacts within occupied GRSG habitat outside PPH would be reduced under Alternative C relative to Alternative B. The types of impacts that would be expected to decrease would include direct mortality from crushing or trampling individuals, negative impacts associated with dust generation, habitat degradation associated with soil compaction and changes in hydrology, and negative impacts associated with spread of invasive non-native species.

### ***Cumulative Effects***

The DEIS considers recreation only a “lesser threat” with respect to “relative cumulative actions” within Management Zone V and does not consider it a threat elsewhere (see Chapter 5 of the DEIS). Management actions associated with travel, transportation and recreation under Alternative C would increase protection of all occupied Greater Sage-Grouse habitat, which would provide an overall long-term benefit to sensitive plants that occur there. Under Alternative C, some of the current travel, transportation and recreation management direction would continue within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), however, measures would be added to conserve existing sagebrush habitat. Because Alternative C would minimize the negative impacts of travel, transportation, and recreation management on sensitive plant species in Management Zones III, IV and V, when combined with the past, present and reasonably foreseeable future actions, this alternative would not substantially increase negative impacts on sensitive plant species.

## **Alternative D**

### **Vegetation and Soils**

#### ***Direct and Indirect Effects***

Alternative D would treat sites within priority and general sage-grouse habitat that are dominated by invasive species through an Integrated Vegetation Management (IVM) approach using fire, chemical, mechanical, and biological methods based on site potential. Targeted grazing would be allowed to suppress cheatgrass or other vegetation hindering the achievement of sage-grouse objectives in priority and general habitat. Sheep, cattle, or goats could be used as long as the animals were intensely managed and removed when the utilization of desirable species reached

35%. Where feasible, sagebrush steppe would be restored in perennial grass, invasive annual grass, and conifer-invaded cover types.

Pinyon and juniper treatment in encroached sagebrush vegetation communities in priority habitat and general habitat would focus on enhancing, reestablishing, or maintaining habitat components (e.g. cover, security, food, etc.) in order to achieve habitat objectives. Phase II and III pinyon and/or juniper stands would be removed or reduced in biomass to meet fuel and sage-grouse habitat objectives, and appropriate action would be taken to establish desired understory species composition, including seeding and invasive species treatments. Treatment methods that maintained sagebrush and shrub cover and composition would be used in areas with a sagebrush component.

Alternative D would be more protective of GRSG habitat than Alternative B because it would include several conservation measures specifically targeted to invasive species infestations and pinyon-juniper encroachment and it would apply them over a larger area (within priority and general habitat) than Alternative B (only PPH). Under Alternative D, the types of impacts of vegetation and soils management on sensitive plants would be similar to those described under Alternative A; however, the conservation measures described above would likely reduce the magnitude of negative impacts on sensitive plants and provide a long-term benefit to species that depend on healthy sagebrush habitats.

### ***Cumulative Effects***

Under Alternative D, current vegetation and soils management treatments within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), including mechanical, manual, chemical, and biological control of invasive plants and pinyon and juniper, would continue, and the long-term beneficial impacts of improved habitat conditions would continue to outweigh the short-term negative impacts of these activities on sensitive plants. However, additional measures to conserve existing sagebrush habitat under Alternative D would provide further long-term benefits to sensitive plants within GRSG habitat. Therefore, the direct and indirect effects of vegetation and soils management on sensitive plants in Management Zones III, IV and V under Alternative D when combined with the past, present and reasonably foreseeable future actions would not substantially increase negative impacts on sensitive plants.

### ***Livestock Grazing***

#### ***Direct and Indirect Effects***

Similar to Alternative B, Alternative D would implement beneficial management actions to incorporate sage-grouse habitat objectives and management considerations into livestock grazing management. Actions that would be particularly relevant to assessing potential positive and negative impacts on sensitive plants include the following: consideration of grazing methods and systems to reduce impacts on sage-grouse habitat; consideration of retiring vacant allotments; improvement in the management of riparian areas and wet meadows; evaluation of existing introduced perennial grass seedings; authorization of new water developments and



structural range improvements only when beneficial to GRSG; potential modification of grazing systems to meet seasonal sage-grouse habitat requirements; and fence removal, modification or marking. The main difference between Alternatives B and D is that Alternative D would apply these conservation measures to priority and general habitat rather than limiting them to PPH as Alternative D would not require the completion of Land Health Assessments to determine if standards of range-land health were being met.

Although the types of impacts on sensitive plants would be expected to be the same as under Alternatives A and B, the level and extent of negative impacts would be expected to be reduced under Alternative D relative to Alternative A and reduced slightly relative to Alternative B. Sensitive plants that occur in PPH and PGH would likely benefit from improving habitat conditions in uplands, riparian areas, meadows, and other wetlands. Almost one-fourth of the sensitive plant species in table 3 occur in riparian areas, meadows, seeps, springs, and other wetland areas, which tend to be used more intensively by livestock than upland areas. Because of these factors and the focus of Alternative D on improving riparian, meadow, and other wetland habitat, sensitive wetland plant species may benefit from Alternative D more than upland species.

### ***Cumulative Effects***

Although livestock grazing occurs throughout all management zones, the DEIS considers it only a “lesser threat” with respect to “relative cumulative actions” in for Management Zone V and does not consider it a threat elsewhere (see Chapter 5 of the DEIS). Portions of Management Zone III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories, which has the potential to compound the effects of livestock grazing on these lands. Forest Service-administered lands within Management zones IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); see Chapter 5 of the DEIS].

Under Alternative D, livestock grazing would continue to be managed through existing grazing plans and wild horse and burro Territories would be managed for Appropriate Management Level within Management Zones III, IV and V (refer to Chapter 5 of the DEIS). Additional measures to conserve existing sagebrush habitat under Alternative D would further minimize negative impacts on sensitive plants within GRSG habitat. Therefore, the direct and indirect effects of livestock grazing and wild horse and burro management on sensitive plants in Management Zones III, IV and V under Alternative D when combined with the past, present and reasonably foreseeable future actions, would not substantially increase negative impacts on sensitive plants.

### ***Fire and Fuels***

#### ***Direct and Indirect Effects***

Unlike Alternative B, which would prioritize suppression in PPH but only in PGH where fires threatened PPH, Alternative D would prioritize suppression in priority and general sage-grouse

habitat. In priority and general habitat, fuels treatments would be similar to those under Alternative B and would emphasize maintaining, protecting, and expanding GRSG habitat. Specifically, measures under Alternative D would include generally enhancing or maintaining sagebrush canopy cover and community structure to match expected potential for the ecological site consistent with sage grouse habitat objectives and requiring the use of native seeds in different types of restoration efforts. Unlike Alternative B, Alternative D would apply these measures to priority and general habitat rather than limiting them to PPH. In addition, Alternative D would prohibit fuels treatment in priority and general habitat if it were determined the treatment would not be beneficial to GRSG or its habitat and identify opportunities for the use of prescribed fire. Alternative D also would prioritize pre-suppression activities in sage-grouse habitats vulnerable to wildfire and prescribe actions important for their protection, implement post-fire treatments in priority and general habitat to maximize benefits to greater sage-grouse, and establish fuel breaks inside and outside of priority habitat to prevent large scale loss of habitat. Overall, these conservation measures would reduce the threat of wildfire to sagebrush compared to Alternative A.

The types of impacts on sensitive plants associated with fire and fuels under Alternative D would be similar to those under Alternative A; however the extent of those impacts and their distribution across the landscape would change. Under Alternative D, sensitive plant species requiring mature sagebrush would be expected to benefit from fire and fuels activities, and sagebrush species that require early successional sagebrush and those that are fire adapted or fire dependent may experience a reduction in suitable habitat over time. With its emphasis on minimizing fire in mature sagebrush, impacts on sensitive plants from suppression would be higher under Alternative D than under Alternative A. Because reseeding efforts would prioritize use of native seed in PPH and PGH over other areas in years of short seed supplies, sensitive plants outside these areas could be more susceptible to habitat degradation from wildfire if limited seed availability reduced revegetation success outside PPH and PGH. Because Alternative D would expand some sagebrush conservation measures to include all occupied GRSG habitat rather than limiting them to PPH, Alternative D would be expected to increase beneficial impacts to sensitive plants that depend on mature sagebrush habitat and increase negative impacts to sensitive plants that are fire adapted or fire dependent and/or require early successional sagebrush habitat. Alternative D also would be expected to increase negative impacts associated with suppression and fuels management relative to Alternative B.

### ***Cumulative Effects***

The cumulative effect of fire and fuels management under Alternative D when combined with the past, present and reasonably foreseeable future actions would be similar to those described for Alternative B and would not be expected to substantially increase negative impacts on sensitive plants within Management Zones III, IV and V. (Please refer to Fire and Fuels under Alternative B above and Chapter 5 of the DEIS).

## Wild Horse and Burro Management

### *Direct and Indirect Effects*

Alternative D would prioritize wild horse and burro gathers in priority and general habitat as opposed rather than prioritizing them only PPH, as Alternative B would. Otherwise, Alternative B is similar to management proposed in Alternative B in that wild horse and burro populations would be managed within established AML to meet sage-grouse habitat objectives for all WHTs within or containing priority or general habitat. Unlike Alternative B, adjustments to AML through the NEPA process would be considered in WHTs not meeting standards due to degradation that could be at least partially contributed to wild horse or burro populations; adjustments would be based on monitoring data and would seek to protect and enhance priority and general habitat and establish a thriving ecological balance. Alternative D would be expected to reduce the impacts of wild horses and burros on GRSG habitat described under Alternative A over a larger area than Alternative B.

Although the types of impacts on sensitive plants would be expected to be the same under Alternative D as they would be under Alternatives A and B, the level and extent of negative impacts would be expected to be reduced under Alternative D. Sensitive plants that occur in PPH and PGH would likely benefit from prioritized gathers in these areas and from other conservation measures that would be applied to these areas.

### *Cumulative Effects*

Portions of Management Zone III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories. Forest Service-administered lands within Management zones IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); see Chapter 5 of the DEIS]. Although livestock grazing occurs throughout all management zones, and has the potential to compound the effects of livestock grazing on these lands, the DEIS considers it only a “lesser threat” with respect to “relative cumulative actions” in Management Zone V and does not consider it a threat elsewhere (see Chapter 5 of the DEIS).

Under Alternative D, wild horse and burro Territories would be managed for Appropriate Management Level and livestock grazing would continue to be managed through existing grazing plans within Management Zones III, IV and V (refer to Chapter 5 of the DEIS). Additional measures to conserve existing sagebrush habitat under Alternative D would reduce overall negative impacts on sensitive plants within GRSG habitat. Therefore, the direct and indirect effects of livestock grazing and wild horse and burro management on sensitive plants in Management Zones III, IV and V under Alternative D when combined with the past, present and reasonably foreseeable future actions would not substantially increase negative impacts on sensitive plants.

## Energy and Locatable Minerals Development

### *Direct and Indirect Effects*

Under Alternative D, a NSO stipulation, with no allowance for waivers, exceptions, or modifications, would be applied to un-leased federal fluid mineral estate in PPH and a NSO stipulation, with allowance for waivers, exception, or modifications, would be applied in un-leased federal fluid mineral estate in PGH. Geophysical exploration that did not entail crushing of sagebrush vegetation or creating new or additional surface disturbance would be allowed within priority and general sage-grouse habitat, but geophysical operations would be subject to timing and controlled surface use limitations. Proposed surface disturbance in unleased priority habitat would have to achieve no net unmitigated loss of priority habitat. Required Design Features (RDFs) would be applied as Conditions of Approval within priority and general sage-grouse habitat on existing fluid mineral leases.

Similar to Alternative A, new plans of operation for authorized locatable minerals on forest service-administered lands would require the inclusion of measures to avoid or minimize adverse effects to GRSG habitat. Priority and general habitat would be closed to non-energy leasable mineral leasing and prospecting. No new commercial mineral material sales would be allowed in priority or general habitat, but sales to meet Federal, Tribal, State, County and public needs would be allowed in general habitat. Loss of habitat through would be off-set through off-site mitigation. Alternative D would manage priority and general habitat as ROW exclusion areas for new large-scale wind and solar energy facilities (see Land Uses and Realty Management), whereas Alternative B would manage PPH as a new ROW exclusion area and PGH as a new ROW avoidance area.

Alternative D would be less protective of PPH than Alternative B with respect to new fluid mineral leasing because Alternative B would close PPH to new fluid mineral leasing. On the other hand, it would be more protective of PGH than Alternative B with respect to new fluid mineral leasing because Alternative B would not include specific management for new or existing fluid minerals leasing in general habitat. Alternative D would be similar to Alternative B with respect to existing fluid mineral leases by requiring application of design features in priority habitat. Under Alternative D, both priority and general habitat would be closed to non-energy leasable mineral leasing and prospecting as opposed to only PPH under Alternative B.

Under Alternative D, the types of impacts of energy and locatable minerals development on sensitive plants would be similar to those described under Alternative A, but their magnitude and spatial distribution would differ. Because of its inclusion of GRSG habitat conservation measures, Alternative D would be expected to reduce negative impacts of energy and locatable minerals development on sensitive plants relative to Alternative A. Sensitive plant impacts associated with energy and locatable minerals development under Alternative D are harder to assess relative to Alternative B because each alternative includes some measures that are more protective than the other in different areas and under different circumstances; however, overall

differences in sensitive plant impacts between the two alternatives are likely to be minor because any ground disturbing activity would be subject to project-level NEPA, which would incorporate appropriate avoidance, minimization, and/or avoidance measures for sensitive plants.

### ***Cumulative Effects***

Energy development is currently a minor threat present only in Management Zone III, but geothermal energy development potential is high throughout Management Zone IV (refer to Chapter 5 of the DEIS). Mining is common across Management Zones III and IV in Nevada and occurs at a variety of scales. Under Alternative D, some of the current management direction associated with energy and locatable minerals development would continue within Management Zones III, IV, and V, however, additional measures would conserve existing sagebrush.

Alternative D would be the same as Alternative A with respect to areas closed to entry, but would add NSO restrictions to all PPH and PGH without waiver, exception, or modification. NSO restrictions would apply to PGH with allowance for waivers, exceptions and modifications. Management under Alternatives D would maintain current acreage open to mineral development but add the application of best management practices and off-site mitigation. Collectively, these measures would minimize negative impacts on sensitive plants in GRSG habitat. The direct and indirect effects of energy and locatable minerals development on sensitive plants in Management Zones III, IV and V from the added management actions under Alternative D when combined with the past, present and reasonably foreseeable future actions would not substantially increase negative impacts on sensitive plants (refer to Chapter 5 of the DEIS).

### **Land Uses and Realty Management**

#### ***Direct and Indirect Effects***

Like Alternative B, Alternative D would include provisions to retain public ownership of priority GRSG habitat and to acquire state and private lands with intact subsurface mineral estate where suitable conservation actions for GRSG could not otherwise be achieved, require co-location of new ROWs or SUAs associated with valid existing rights with existing development, and, where appropriate, bury new and existing utility lines as mitigation unless. Unlike Alternative B, Alternative D would manage priority and general habitat as ROW exclusion areas for new large-scale commercial wind and solar energy facilities and ROW avoidance areas for all other ROWs or SUAs. Development within avoidance areas could occur if the development incorporated appropriate RDFs in design and construction (e.g. noise, tall structure, seasonal restrictions, etc.) and development resulted in no net un-mitigated loss of priority or general habitat. In addition, ROW holders in priority and general habitat would be required to retro-fit existing power lines and other utility structure with perch-detering devices during ROW renewal process. These conservation measures would make this alternative more protective than Alternative A, although the general effects and types of impacts on sensitive plants would be the same. Alternative D would be less protective than Alternatives B and C with respect to new siting of general ROWs and SUAs because priority habitat would be an avoidance area rather than an exclusion area. As a result, negative impacts to sensitive plants within these avoidance areas could be greater under

Alternative D than under Alternatives B and C. However, Alternative D would be more protective than Alternatives B and C with respect to large-scale commercial wind and solar energy facilities because Alternative D would exclude such facilities in priority and general habitat altogether. This exclusion would likely reduce negative impacts on sensitive plants in PPH and PGH under Alternative D relative to Alternatives B and C.

### ***Cumulative Effects***

Management actions associated with land uses and realty management under Alternative D would increase conservation of Greater Sage-Grouse habitat. Under Alternative D, some of the current land and realty operations would continue within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), however, additional measures would conserve existing sagebrush habitat and thereby minimize long-term negative impacts on sensitive plants that occur there. Land uses and realty management activities would focus ROW exclusion or avoidance areas in Greater Sage-Grouse habitat. Therefore, the direct and indirect effects of lands and realty management to Greater Sage-Grouse in Management Zones III, IV and V under Alternative D when combined with the past, present and reasonably foreseeable future actions would not substantially increase impacts on sensitive plants.

## **Travel, Transportation and Recreation Management**

### ***Direct and Indirect Effects***

Under current management, travel on most Forest Service-administered lands is limited to designated roads, although off road motorized big game retrieval within ½ mile of roads is authorized on the Mountain City, Ruby Mountains, and Jarbidge Ranger Districts of the Humboldt-Toiyabe National Forest, with some restrictions. Like Alternative B, Alternative D would limit motorized travel to designated routes, limit opportunities for road construction and apply minimum standards, prohibit the upgrading of current roads, and permit only recreational SUAs that were neutral or beneficial to sage-grouse. Unlike Alternative B, Alternative D would extend these measures beyond PPH to include PGH. In addition, under Alternative D no new recreation facilities (including, but not limited to, campgrounds, day use areas, scenic pullouts, trailheads, etc.) would be constructed in priority or general habitat. Although general impacts would be the same as Alternative A, Alternative D would be more restrictive than Alternative A or Alternative B. It would likely reduce loss, fragmentation and disturbance of GRSG habitat by minimizing human use and road construction or upgrades.

Although the types of impacts of travel, transportation, and recreation management on sensitive plants would be expected to be the same under Alternative D as under Alternatives A and B, the level and extent of negative impacts would be expected to be reduced under Alternative D because conservation measures would be applied throughout GRSG habitat.

### ***Cumulative Effects***

The DEIS considers recreation only a “lesser threat” with respect to “relative cumulative actions” within Management Zone V and does not consider it a threat elsewhere (see Chapter 5



of the DEIS). Management actions associated with travel, transportation and recreation under Alternative D would increase conservation of Greater Sage-Grouse habitat within PPH and PGH, and thereby minimize potential negative impacts on sensitive plants that occur within those habitat areas. Under Alternative D, some of the current travel, transportation and recreation management direction would continue within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), however, additional measures to conserve existing sagebrush habitat would be included. Because Alternative D would minimize the negative impacts of travel, transportation, and recreation management on sensitive plant species in Management Zones III, IV and V, when combined with the past, present and reasonably foreseeable future actions this alternative would not substantially increase negative impacts on sensitive plant species.

## **Alternative E**

### **Vegetation and Soils**

#### ***Direct and Indirect Effects***

Under Alternative E, invasive plants would be managed through a combination of surveys, biological control, educational activities, native planting and reseedling of previously treated sites in areas susceptible to invasion, and weed-free gravel and forage certifications and inspections. SGMAs would be managed to prevent invasive species and to suppress and restore areas with existing infestations. Existing areas of invasive vegetative that pose a threat to SGMAs would be treated through the use of herbicides, fungicides, or bacteria to control cheatgrass and medusahead infestations. All burned areas within SGMAs would be reviewed and evaluated in a timely manner to ascertain the reclamation potential for reestablishing Sage-Grouse habitat, enhancing ecosystem resiliency, and controlling invasive weed species.

Under Alternative E, landscape-level treatments in Sage-Grouse Management Areas (SGMAs) would be initiated to reverse the effects of pinyon-juniper encroachment and restore healthy, resilient sagebrush ecosystems. Plans to remove Phase I and Phase II encroachment and treat Phase III encroachment would be aggressively implemented to reduce the threat of severe conflagration and restore SGMAs where possible, especially in areas in close proximity to Occupied and Suitable Habitat. Temporary roads to access treatment areas would be allowed and constructed with minimum design standards to avoid and minimize impacts and removed and restored upon completion of treatment. Under Alternative E, the State of Nevada would continue to incentivize and assist in the development of bio-fuels and other commercial uses of pinyon-juniper resources and increase the incentives for private industry investment in biomass removal, land restoration, and renewable energy development by authorizing stewardship contracts for up to 20 years. Alternative E would provide for an increase in conifer encroachment efforts for GRSG habitat compared to Alternative A and addresses it more specifically than Alternatives B or C.

The types of impacts of vegetation and soils management on sensitive plants species would be similar to those described under Alternative A; however, the magnitude and spatial distribution

of those impacts would differ. Because Alternative E includes more intensive invasive plant control efforts in GRSG habitat than Alternative A, sensitive plants that occur in healthy GRSG impacts would likely experience a long-term benefit from Alternative E. Treatment activities could have negative impacts on sensitive plant species that occur in treatment areas, as described under Alternative A, and the magnitude of these impacts on species that occur within GRSG habitat would be expected to increase under Alternative E relative to Alternative. Because conifer encroachment would be managed more aggressively under Alternative E than under Alternatives A or B, Alternative E would likely reduce the magnitude of the negative impacts on sensitive plants associated with conifer encroachment and provide a long-term benefit to species that depend on healthy sagebrush habitats relative to these other alternatives. Impacts associated with managing conifer encroachment under Alternative E would be expected to increase relative to Alternatives A and B and could negatively impact sensitive plants that are restricted to conifer habitats.

### *Cumulative Effects*

Under Alternative E, current vegetation and soils management treatments, including mechanical, manual, chemical, and biological control of invasive plants and pinyon and juniper, would continue within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), and the short-term negative impacts of these activities on sensitive plants within GRSG habitats would continue to be outweighed by the long-term beneficial impacts of improved habitat conditions. Additional measures to conserve existing sagebrush habitat under Alternative E would provide a further net benefit to sensitive plants within GRSG habitat. Therefore, the direct and indirect effects of vegetation and soils management to Greater Sage-Grouse in Management Zones III, IV and V from the management actions under Alternative E when combined with the past, present and reasonably foreseeable future actions would not substantially increase negative impacts on sensitive plants.

### *Livestock Grazing*

#### *Direct and Indirect Effects*

Alternative E would manage grazing permits to maintain or enhance SGMAs. It would utilize livestock grazing, when appropriate as a management tool, to improve Sage-Grouse habitat quantity, quality or to reduce wildfire threats. Alternative E would expand the promotion of proper livestock grazing practices that promote the health of perennial grass communities in order to suppress the establishment of cheatgrass. Riparian areas would be managed to current agency standards. Within riparian areas, Alternative E would promote grazing within acceptable limits and development of additional infrastructure (e.g., fences and troughs) in order to facilitate this action.

Under Alternative E, the types of impacts on sensitive plants from livestock grazing would be expected to be the same as discussed for Alternative A. However, in comparison with Alternative A, management under Alternative E could increase the level of impacts to sensitive



plant species within riparian areas because of its promotion of riparian grazing. Although newly grazed riparian areas would be managed to current standards, such management would minimize but not eliminate potential impacts on sensitive plants.

### ***Cumulative Effects***

Although livestock grazing occurs throughout all management zones, the DEIS considers it only a “lesser threat” with respect to “relative cumulative actions” in Management Zone V and does not consider it a threat elsewhere (see Chapter 5 of the DEIS). Portions of Management Zone III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories, which has the potential to compound the effects of livestock grazing on these lands; Forest Service-administered lands within Management zones IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); see Chapter 5 of the DEIS].

Alternative E would impose fewer management limitations on livestock grazing within Management Zones III, IV and V (refer to Chapter 5 of the DEIS) than Alternative A and would promote grazing in riparian areas. Wild horse and burro Territories would be managed for Appropriate Management Level as under current management. Under Alternative E, the direct and indirect effects of livestock grazing in conjunction with the past, present and reasonably foreseeable future actions could increase fragmentation of the existing sagebrush habitat in Management Zones III, IV and V (refer to Chapter 5 of the DEIS) and contribute to negative cumulative impacts on sensitive plants.

### **Fire and Fuels**

#### ***Direct and Indirect Effects***

Under Alternative E, fire and fuels management would emphasize sagebrush habitat protection and restoration within the State of Nevada Sage-Grouse Management Areas. With respect to hazardous fuels treatments, this alternative would set a goal of supporting incentives for developing a beneficial use for biomass. Wildland fires in SGMAs would be managed to reduce the number of wildfires that escape initial attack and become greater than 300 acres down to two to three percent of all wildfire ignitions over a ten year period. Additional emphasis under Alternative E would integrate the prepositioning of suppression resources and preventative actions similar to Alternative D. Prepositioning and preventive actions would increase the likelihood of successful fire management actions with response to wildfire. Fuels reduction treatments would be similar to those under Alternative B, with added emphasis on coordination of state and local agencies and individual landowners.

Under Alternative E, the types of impacts of fire and fuels management on sensitive plants would be similar to those discussed under Alternative A, though their magnitude and spatial distribution would be expected to differ as a result of the management actions designed to conserve GRSG habitat. Positive and negative impacts of these actions on sensitive plants that occur within

GRSG habitat and adjacent areas within which preventive actions and suppression may occur would be expected to increase relative to Alternative A.

### ***Cumulative Effects***

The cumulative effect of fire and fuels management actions under Alternative E when combined with the past, present and reasonably foreseeable future actions would be similar those described for Alternative B and would not be expected to substantially increase negative impacts on sensitive plants within Management Zones III, IV and V. (Please refer to Fire and Fuels under Alternative B above and Chapter 5 of the DEIS).

## **Wild Horse and Burro Management**

### ***Direct and Indirect Effects***

Under Alternative E, wild horse and burro management would be similar to that under Alternative A, though Alternative E would include additional management measures to benefit the GRSG. Alternative E would maintain wild horses at AML in WHTs to avoid and minimize impacts on Sage-Grouse Management Areas, evaluate conflicts with WHT designations in Sage-Grouse Management Areas, modify Land Use Plans and Resource Management Plans to avoid negative impacts on GRSG and, if necessary, resolve conflicts between the Wild and Free Roaming Horse and Burro Act and the Endangered Species Act.

The types of impacts of wild horse and burro management under Alternative E on sensitive plants would be similar to those discussed for Alternative A; however Alternative E would likely improve conditions for sensitive plants that occur within GRSG habitat slightly relative to Alternative A by reducing the direct and indirect negative impacts of wild horses and burros and improving GRSG habitat conditions.

### ***Cumulative Effects***

Portions of Management Zone III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories. Forest Service-administered lands within Management zones IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); see Chapter 5 of the DEIS]. Under Alternative E, wild horse and burro Territories would be managed for Appropriate Management Level as under current management. Therefore, the direct and indirect effects of wild horse and burro management on sensitive plants in Management Zones III, IV and V under Alternative E when combined with the past, present and reasonably foreseeable future actions, would not substantially increase negative impacts on sensitive plants.

## **Energy and Locatable Minerals Development**

### ***Direct and Indirect Effects***

Alternative E would minimize conflicts with GRSG habitat by siting new minerals and energy facilities and activities outside habitat wherever possible. Projects with an approved BLM notice, plan of operation, right-of-way, or drilling plan would be exempt from any new mitigation

requirements above and beyond what has already been stipulated in project approvals. Exploration projects would be designed for mineral access and the betterment of GRSG habitat. Roads and other ancillary features that impact GRSG habitat would be designed to avoid where feasible and otherwise minimize and mitigate impacts in the short and long term. New linear features would be sited in existing corridors or, at a minimum, co-located with existing linear features in SGMAs. Energy developers would be required to work closely with state and federal agency experts to determine important GRSG nesting, brood rearing and winter habitats and avoid those areas, and energy development or infrastructure features would be restricted within a 0.6 mile (1 km) radius around seeps, springs and wet meadows within identified brood rearing habitats wherever possible. As previously stated, Alternative E would not provide fixed exclusion or avoidance areas, leaving all management subject to an avoid, minimize, and mitigate approach, which provides a lower level of certainty than alternatives that have fixed exclusion and avoidance land allocations based on PPH and PGH designations.

Under Alternative E, the types of impacts on sensitive plants from energy and locatable minerals development would be similar to those discussed under Alternative A. However, the magnitude of such impacts under Alternative E could be greater because projects with an approved BLM notice, plan of operation, right-of-way, or drilling plan would be explicitly exempt from new mitigation requirements, which could provide for greater conservation of GRSG habitats, whereas such project would not necessarily be exempt under Alternative A.

#### Cumulative Effects

Energy development is currently a minor threat present only in Management Zone III, but geothermal energy development potential is high throughout Management Zone IV (refer to Chapter 5 of the DEIS). Mining is common across Management Zones III and IV in Nevada and occurs at a variety of scales. Unlike Alternatives B, C, D, or F, Alternative E would not incorporate any defined exclusion or avoidance areas within Management Zones III, IV and V (refer to Chapter 5 of the DEIS). Alternative E would leave all management subject to an avoid, minimize, and mitigate approach, which would provide a lower level of habitat conservation certainty than Alternatives with defined exclusion or avoidance areas. Therefore, under Alternative E, the direct and indirect effects of energy and locatable minerals development in conjunction with the past, present and reasonably foreseeable future actions may increase loss and fragmentation of the existing sagebrush habitat in Management Zones III, IV and V (refer to Chapter 5 of the DEIS) and contribute to negative cumulative impacts on sensitive plants.

### **Land Uses and Realty Management**

#### ***Direct and Indirect Effects***

Under Alternative E, no areas would be subject to exclusion or avoidance, but habitat disturbance, including habitat improvement projects, in Occupied and Suitable Habitat would be limited to not more than five percent per year, and in Potential Habitat to not more than twenty percent per year, per SGMA, unless habitat treatments showed credible positive results. On

federal lands in Nevada with pre-approved activities, no new mitigation would take place beyond previously approved in Plans of Development, right of ways, or drilling plans. General guidance would be to avoid when possible, minimize adverse effects as practicable, and mitigate adverse effects in Occupied or Suitable Habitat. Whenever possible, this alternative would locate facilities in non-habitat areas, site new linear features in existing corridors or co-locate them with other existing features and engage in reclamation and weed control efforts. This alternative provides few conservation measures when compared to Alternative A to reduce direct or indirect impacts to GRSG and GRSG habitats. As a result, the types, level, and spatial distribution of impacts on sensitive plants from land uses and realty management under Alternative E would be similar to those discussed under Alternative A.

### ***Cumulative Effects***

Management actions associated with land uses and realty under Alternative E would not include specific exclusion or avoidance areas but would limit total disturbance within Occupied and Suitable Habitats and implement an avoid, minimize, mitigate approach, as discussed above. This would provide a lower level of certainty for Greater Sage-Grouse habitat conservation under Alternative E than under alternatives that have fixed exclusion and avoidance areas based on habitat designations and could lead to greater habitat fragmentation under Alternative E. Therefore, the direct and indirect effects land uses and realty management under Alternative E in conjunction with the past, present and reasonably foreseeable future actions may increase loss and fragmentation of the existing sagebrush habitat in Management Zones III, IV or V (refer to Chapter 5 of the DEIS) and contribute to negative cumulative impacts on sensitive plants.

## **Travel, Transportation and Recreation Management**

### ***Direct and Indirect Effects***

Under Alternative E, travel, transportation and recreation management would essentially remain the same as it currently is under Alternative A. Therefore, the types, level, and spatial distribution of impacts on sensitive plants from travel, transportation, and recreation management under Alternative E would be similar to those discussed under Alternative A.

### ***Cumulative Effects***

The DEIS considers recreation only a “lesser threat” with respect to “relative cumulative actions” in Management Zone V and does not consider it a threat elsewhere (see Chapter 5 of the DEIS). Current travel, transportation and recreation management as it exists under Alternative A would continue under Alternative E. The limitation of motorized travel to existing routes and permitting of recreational SUAs that would be neutral or beneficial to sensitive plants within GRSG habitat, as well as limited opportunities for road construction and upgrading of current roads, would not be instituted as they would be in Alternatives B, C, D and F. Under Alternative E, the direct and indirect effects from travel, transportation and recreation management in conjunction with the past, present and reasonably foreseeable future actions may increase loss

and fragmentation of the existing sagebrush habitat in Management Zones III, IV and V (refer to Chapter 5 of the DEIS) and contribute to negative cumulative impacts on sensitive plants.

## **Alternative F**

### **Vegetation and Soils**

#### ***Direct and Indirect Effects***

Like Alternative B, Alternative F generally would follow existing direction for invasive species control. However, Alternative F would include the following additional measures: (1) monitor and control invasive vegetation in treated, burned, or restored sagebrush steppe; (2) restrict activities in GRSG habitat that facilitate the spread of invasive plants; (3) in GRSG habitat, ensure that soil cover and native herbaceous plants are at their ecological potential to help protect against invasive plants; and (4) develop and implement methods for prioritizing and restoring sagebrush steppe invaded by non-native plants. Like Alternative B, vegetation management under Alternative F would prioritize restoration of GRSG habitats, which would be expected to provide a long-term benefit to sensitive plants that occur in those habitats. Under Alternative F, short-term impacts of invasive plant treatments and other restoration actions, particularly those that involve mechanized equipment or the use of herbicides, could negatively impact individual sensitive plants (for example, by crushing or herbicide drift). Such impacts would be expected to be minimal as project level environmental review would be done and appropriate avoidance or minimization measures would be incorporated.

Under Alternative F, the use of native seed would be required for reseeded of closed roads, primitive roads, and trails. The use of native seed would be favored in other types of restoration under Alternative F, as it would be under Alternative B. Current FS policy (FSM 2070.3) already restricts the use of non-native seed in restoration and prohibits the use of invasive species, so the impact of the native seed emphasis for restoration in Alternative F is unlikely to result in a measurable additional benefit to sensitive plant species over Alternatives A or B. Monitoring and invasive species control after fuels treatments and at existing range improvements incorporated into Alternative F could benefit sensitive plant species by minimizing habitat degradation caused by invasive species. Overall, Alternative F would be likely to reduce impacts of invasive non-native plants on sensitive plants relative to Alternative A and may provide a marginal benefit over Alternative B.

Like Alternatives A and B, Alternative F does not directly address conifer encroachment. The types of impacts of conifer encroachment on sensitive plants under Alternative F would be expected to be the same as those under Alternative A. Although the types of impacts would be the same, the conservation measures described above for invasive plants and the fuels treatments described below in Fire and Fuels would likely reduce the magnitude of the impacts on sensitive plants associated with conifer encroachment relative to Alternative A and could provide an additional reduction in the magnitude of impacts on sensitive plants from conifer encroachment relative to Alternative B.

### ***Cumulative Effects***

Under Alternative F, current vegetation and soils management treatments within Management Zones III, IV and V (refer to Chapter 5 of the DEIS) (including mechanical, manual, chemical, and biological control of invasive plants and pinyon and juniper) would continue, and the long-term beneficial impacts of improved habitat conditions would continue to outweigh the short-term negative impacts of these activities on sensitive plants. Additional measures to conserve existing sagebrush habitat under Alternative F would provide a further net benefit to sensitive plants within GRSG habitat. Therefore, the direct and indirect effects of vegetation and soils management to Greater Sage-Grouse in Management Zones III, IV and V from the management actions under Alternative F when combined with the past, present and reasonably foreseeable future actions would not substantially increase negative impacts on sensitive plants.

### **Livestock Grazing**

#### ***Direct and Indirect Effects***

Like Alternative B, Alternative F would incorporate sage grouse habitat objectives and sage grouse management considerations into livestock grazing management, but Alternative F would extend those to all occupied habitat rather than limiting them to PPH. Actions that would be expected to directly or indirectly impact sensitive plants include completion of range condition assessments, consideration of grazing methods and systems to reduce impacts on occupied GRSG habitat, modification of grazing systems in occupied GRSG habitat to meet seasonal sage grouse habitat requirements, improved management of riparian areas and wet meadows in occupied GRSG habitat, evaluation of existing introduced perennial grass seedings in occupied GRSG habitat, prohibiting new water developments in occupied GRSG, avoiding new structural range improvements in occupied GRSG habitat unless studies show they benefit GRSG, incorporation of BMPs for West Nile Virus, and fence removal. Additional actions in Alternative F that entail more than an extension of Alternative B actions to all occupied habitat include excluding livestock grazing from burned areas until woody and herbaceous plants achieve GRSG habitat objectives, closing the entire allotment if burned GRSG habitat cannot be fenced from unburned habitat, and increasing monitoring of vegetation treatments.

The types of impacts on sensitive plants from livestock grazing management under Alternative F would be expected to be the same as under Alternatives A, B, and F. Overall, the level and extent of negative impacts would be expected to be reduced in Alternative F. Sensitive plants that occur in occupied GRSG would likely benefit from improving habitat conditions in uplands, riparian areas, meadows, and other wetlands. Almost one-quarter of the sensitive plant species in table 3 occur in riparian areas, meadows, seeps, springs, and other wetland areas, which tend to be used more intensively by livestock than upland areas. Because of these factors and the focus of Alternative F on improving riparian, meadow, and other wetland habitat throughout occupied GRSG habitat, sensitive wetland plant species may benefit from Alternative B more than upland species.



### ***Cumulative Effects***

Although livestock grazing occurs throughout all management zones, the DEIS considers it only a “lesser threat” with respect to “relative cumulative actions” for Management Zone V and does not consider it a threat elsewhere (see Chapter 5 of the DEIS). In addition, portions of Management Zone III (89 percent of BLM land/8 percent Forest Service) are within wild horse and burro HMAs and Territories, which has the potential to compound the effects of livestock grazing on these lands. Forest Service-administered lands within Management zones IV and V do not contain wild horse and burro Territories [IV (95 percent of BLM land/0 percent Forest Service) and V (91 percent of BLM land/0 percent Forest Service); see Chapter 5 of the DEIS].

Under Alternative F, livestock grazing would continue to be managed through existing grazing plans within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), and wild horse and burro territories would be managed for Appropriate Management Level. Additional measures to conserve existing sagebrush habitat under Alternative F would further minimize potential negative impacts on sensitive plants within GRSG habitat. Therefore, the direct and indirect effects of livestock grazing and wild horse and burro management on sensitive plants in Management Zones III, IV and V under Alternative F when combined with the past, present and reasonably foreseeable future actions would not substantially increase negative impacts on sensitive plants.

### **Fire and Fuels**

#### ***Direct and Indirect Effects***

Because fire and fuels management under Alternative F would be essentially the same as under Alternative B, the types of fire and fuels related impacts of Alternative F on sensitive plants would be the same as those discussed above for Alternative B. Under Alternative F, sensitive plant species requiring mature sagebrush would be expected to benefit from fire and fuels activities, and sagebrush species that require early successional sagebrush and those that are fire adapted or fire dependent may experience a reduction in suitable habitat over time. With its emphasis on minimizing fire in mature sagebrush, impacts on sensitive plants from suppression would be higher under Alternative F than under Alternative A. Because reseeding efforts would prioritize use of native seed in GRSG habitat over other areas in years of short seed supplies, sensitive plants in areas outside GRSG habitat could be more susceptible to habitat degradation from wildfire if limited seed availability reduced revegetation success outside GRSG habitat.

Elements of Alternative F that differ from those of Alternative B and could lead to differences in the extent of direct and indirect beneficial and negative impacts on sensitive plants between the two alternatives include the following: (1) excluding livestock grazing from burned areas in GRSG occupied habitat until woody and herbaceous plants achieve GRSG habitat objectives; and (2) applying fuels management provisions (including post-fire revegetation and invasive species control) to all occupied habitat rather than limiting them to PPH. These differences would decrease the negative effects of fire and fuels management on sensitive plants in burned

areas and increase the impacts on sensitive plants in treatment areas. As discussed in the previous paragraph, impacts to sensitive plants in treatment areas could be positive or negative, depending on their habitat requirements. Overall, the difference in impacts on sensitive plants between Alternatives B and F would likely be negligible because the differences between fire and fuels management under the two alternatives would be minimal.

### ***Cumulative Effects***

The cumulative effects of fire and fuels management actions under Alternative F when combined with the past, present and reasonably foreseeable future actions would be similar to those described for Alternative B and would not be expected to substantially increase negative impacts on sensitive plants within Management Zones III, IV and V. (Please refer to Fire and Fuels under Alternative B and above Chapter 5 of the DEIS.)

## **Wild Horse and Burro Management**

### ***Direct and Indirect Effects***

Wild horse and burro management under Alternative F would be similar to that proposed under Alternative B, although Alternative F would extend some management provisions to all GRSG habitat rather than limiting them to priority habitat. Specific provisions that would be expanded to all habitat under Alternative F include: (1) amending herd management area and herd area plans within all GRSG habitat to incorporate sage-grouse habitat objectives; and (2) addressing the direct and indirect effects on sage-grouse populations and habitat when conducting NEPA analysis for free-roaming horse and burro management activities, water developments, or other range developments for free-roaming horses in sage-grouse habitat.

Because wild horse and burro management under Alternative F would be very similar to that under Alternative B, the types of impacts to sensitive plants would be the same as discussed above for Alternative B. However, the expansion of some management measures that would promote habitat conservation to all GRSG habitat under Alternative F may provide a marginal benefit to sensitive plants that occur in GRSG habitat but outside PPH relative to Alternative B.

### ***Cumulative Effects***

The cumulative effects of wild horse and burro management actions under Alternative F when combined with the past, present and reasonably foreseeable future actions would be similar to those described for Alternative B and would not be expected to substantially increase negative impacts on sensitive plants within Management Zones III, IV and V. (Please refer to Wild Horse and Burro Management under Alternative B above and Chapter 5 of the DEIS.)

## **Energy and Locatable Minerals Development**

### ***Direct and Indirect Effects***

Under Alternative F, energy and locatable minerals development would be similar to proposed management under Alternative B. Under Alternative F the following also would apply: siting of wind energy development would be prevented in PPH; PPH would be closed to new fluid



mineral leasing, nonenergy leasable mineral leasing, and mineral material sales; PPH would be proposed for withdrawal from mineral entry; no new surface occupancy (NSO) would be stipulated for leased fluid minerals; and a 3% disturbance cap would be applied to PPH. Numerous conservation measures would be implemented to reduce impacts from mineral exploration and development activities in PPH. Like Alternative B, Alternative F does not include specific management for locatable, or saleable or nonenergy minerals in PGH. Unlike Alternative B, Alternative F directly addresses wind energy and fluid minerals development outside of PPH: wind energy would be sited at least five miles from active sage-grouse leks and at least four miles from the perimeter of sage-grouse winter habitat, and areas within 4 miles of active sage-grouse leks would be closed to new fluid minerals leasing.

Under Alternative F, the types of impacts of energy and locatable minerals development on sensitive plants would be similar to those described for Alternative A, though their magnitude and spatial distribution would differ. With its conservation measures in PPH, Alternative F would likely decrease negative impacts on sensitive plants relative to Alternative A. Because Alternative F is similar to Alternative B but also addresses wind energy and fluid minerals leasing outside PPH more thoroughly than Alternative B, Alternative F would likely reduce negative impacts of energy and locatable minerals development on sensitive plants relative to Alternative B.

### ***Cumulative Effects***

Energy development is currently a minor threat present only in Management Zone III, but geothermal energy development potential is high throughout Management Zone IV (refer to Chapter 5 of the DEIS). Mining is common across Management Zones III and IV in Nevada and occurs at a variety of scales. Under Alternative F, some of the current energy and locatable minerals management direction would continue within Management Zones III and IV, however, additional measures would conserve existing sagebrush habitat by adding all PPH to existing closures and proposing it for withdrawal. Therefore, the direct and indirect effects on sensitive plants in GRSG habitat in Management Zones III, IV and V from the management actions associated with energy and locatable minerals under Alternative F when combined with the past, present and reasonably foreseeable future actions would not substantially increase negative impacts on sensitive plants.

## **Land Uses and Realty Management**

### ***Direct and Indirect Effects***

Land uses and realty management under Alternative F would essentially be the same as that under Alternative B, so associated impacts on sensitive plants would be as described for Alternative B above.

### ***Cumulative Effects***

The cumulative effects of land uses and realty actions under Alternative F when combined with the past, present and reasonably foreseeable future actions would be similar to those described

for Alternative B and would not be expected to substantially increase negative impacts on sensitive plants within Management Zones III, IV and V. (Please refer to Land Uses and Realty Management under Alternative B above Chapter 5 of the DEIS.)

## **Travel, Transportation and Recreation Management**

### ***Direct and Indirect Effects***

With respect to travel, transportation and recreation, Alternative F is similar to Alternative B: within PPH, only recreational SUAs that were neutral or beneficial to GRSG would be permitted; opportunities for new route construction would be limited, and upgrading of existing routes generally could occur only if they would not result in a new route category (road, primitive road, or trail) or capacity. In addition, Alternative F would expand the Alternative B measure restricting motorized travel to designated routes in PPH to include PGH, designated routes in sage-grouse priority habitat would be considered for closure, camping areas within 4 miles of active leks would be closed seasonally, road or area closures to protect breeding, nesting and brood rearing sage-grouse would be implemented permanently or seasonally, and new road construction would be prohibited within 4 miles of active sage-grouse leks.

Although the types of impacts of travel, transportation, and recreation management on sensitive plants would be expected to be the same under Alternative F as under Alternatives A and B, the level and extent of negative impacts would be expected to be reduced under Alternative F because it would incorporate additional measures to conserve GRSG habitat.

### ***Cumulative Effects***

The DEIS considers recreation only a “lesser threat” with respect to “relative cumulative actions” for Management Zone V and does not consider it a threat elsewhere (see Chapter 5 of the DEIS). Management actions associated with travel, transportation and recreation under Alternative F would increase conservation of Greater Sage-Grouse habitat within PPH and, in some instances, PGH and PPH, and minimize the negative impacts of recreation and travel management on sensitive plants that occur in those areas. Under Alternative F, some of the current travel, transportation and recreation management direction would continue within Management Zones III, IV and V (refer to Chapter 5 of the DEIS), however, additional measures to conserve existing sagebrush habitat would be included. Because Alternative F would minimize the negative impacts of travel, transportation, and recreation management on sensitive plant species in Management Zones III, IV and V, when combined with the past, present and reasonably foreseeable future actions, this alternative would not substantially increase negative impacts on sensitive plant species.

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